

Date: 10/24/2012

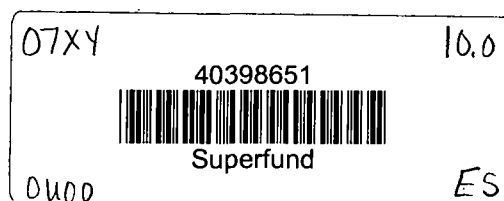
From: Jolleen Werst, Senior Cost Recovery Specialist

To: St Louis Army Ammunition Plant, Site File

Subj: Documents for Contract 68-W6-0012

The attached documents are site specific documents for contract 68-W6-0012. These documents need to be kept as a package as they were received as the Project Officer's files and are being kept for cost recovery purposes.

The documents pertain to TDD# S07-9902-008 under contract 68-W6-0012.



## DOCUMENT LOG SHEET

TDD# S07-9902-008

PAN# 1165SLTGFF

PROJECT NAME: St. Louis Army Ammunition Plant

CITY/COUNTY/STATE: St. Louis, Missouri

PROJECT LEADER: KOPPER

EPA CONTACT: DIANA BAILEY

COMPLETION DATE:

SOURCE OF FUNDS: (Shaded Area Below)

04-23-99

CERCLA

OPA/CWA

CEPP

X

TDD: 03-11-99 LKS

AOC:

## DELIVERABLES

FORMAL REPORT:

X

LETTER REPORT:

*dated 7-29-99 (8-13-99 LKS)*

FORMAL BRIEFING:

X

OTHER (SPECIFY): *DRAFT PA Review RJW (7-2-99)*

VENDER PACKET:

ADMIN. REC.:

DISKS:

PRINTOUTS:

X

MEMO *Draft Preliminary Assessment Review 6/21/99 (pw 7-7-99)*

VERBAL BRIEFING-NO DELIVERABLE NEEDED:

X

OTHER (SPECIFY): *COI letter dated 2-26-99 (7-23-99 LKS)*

SITE SAFETY PLAN:

LOG BOOK(S) (HOW MANY):

PHOTOGRAPHS:

PHOTOGRAPHIC RECORD:

CONFLICT OF INTEREST (COI) FORM:

X

TYPING REQUEST FORM(S): *8-13-99*

OTHER (SPECIFY):

Funding: Federal Facility

PROJECT LEADER INITIALS/DATE:

Place An "X" Next To Document Being Filed. Include Date of Document, Name of Document (or brief description), Date Filed, and Your Initials.

105  
2/22/99

**EPA**

**Technical Direction Document  
(TDD)**

07-99-02-0008

1165SLTGFF

START CONTRACT #: 68-W6-0012

~~Flatiron~~ Kopper

<b>Activity Type:</b> IV.A.1. Preliminary Assessments <b>Task:</b> Federal Facility PA Review <b>General Task Description:</b> Conduct Federal Facility PA Review on currently owned Fed. Fac. under DOD/Army <b>Estimated Completion Date:</b> 04/23/99		<b>Created On:</b> 02/20/99 <b>DPO/PO:</b> Diana Bailey <b>Task Monitor:</b> Diana Bailey <b>Task Codes:</b> TG/FF; RX
<b>Site/Project Name:</b> St. Louis Army Ammunition Plant (Army-SLAAP) <b>Street Address:</b> 4800 Goodfellow Blvd <b>County Name:</b> Saint Louis <b>City, State, Zip:</b> St Louis, MO 63120 <b>SSID #:</b> 07YX <b>CERCLIS #:</b> MO4210021222		<b>Estimated Cost:</b> \$9,000.00 <b>Estimated Hrs:</b> 180
<b>Funds Source:</b> Federal Facility <b>DCN #(s):</b> W18149 () CERCLA/FUDs \$9,000.00		<b>Deliverable:</b> CERCLA PA w/RSE, CERCLIS Data Entry Information, Letter Report <b>Overtime:</b> Not Applicable <b>Reference:</b> No
<b>TDD Expenditure Limit:</b> \$9,000.00 <b>Hours:</b> 180		<b>Staffing:</b> Dedicated and Non-Dedicated <b>Priority:</b> High <b>Start Date:</b> 02/10/99

**Specific Element(s):** Coordinate activities with RPM/OSC, Complete PA-Score Sheets, Obtain and review existing site, facility and/or release data provided by EPA, Make recommendations and provide options to EPA as to further response action, Review EPA files for background information, Meet w/ EPA prior to issuance of site-specific TDD

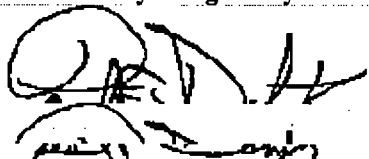
**Comments:** This is file review task and does not involve field work or sampling or a site visit. This is a Desk audit of the file material provided. This is a EPA review of the Fed. agencies material as if EPA was doing the PA and a audit of what is and what is not missing. Mark missing data on a check list. Task code is RX; DCN/Account code **W18149**  
**98T07W0FFAX25053207WZZB00**; Line Ref is **BFM** This is a High priority because the Army and GSA has put this site on a fast track for property transfer. Coordinate with Diana Bailey ex. 7717

**Standard Language:** The Contractor is required to wear proper identification in accordance with START Contract Clause H.1, entitled "IDENTIFICATION OF CONTRACTOR PERSONNEL").

EPA will evaluate recommendations of the Contractor and will make the final determinations regarding the appropriate courses of action.

Work in excess of 40 hours per week is authorized. Overtime premium pay is not authorized by this TDD.

**A. TDD Created By:** - Signed by Paul Doherty/SUPR/R7/USEPA/US on 02/20/99 11:47:40 AM, according to J:

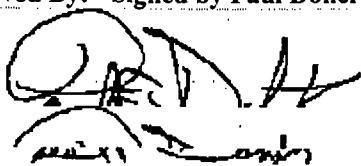


Paul Doherty

02/10/99

Signed On:

B. Reviewed and Approved By: - Signed by Paul Doherty/SUPR/R7/USEPA/US on 02/20/99 11:47:40 AM, acc

A handwritten signature in black ink, appearing to be 'Paul Doherty', written over a horizontal line.

Project Officer:

Paul Doherty

02/20/99

Signed On:

**START CONTRACT # 68-W6-0012**

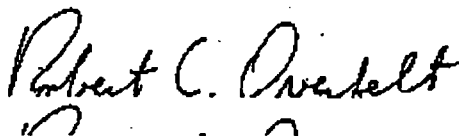
<b>Site/Project Name:</b> St. Louis Army Ammunition Plant (Army-SLAAP)		<b>DPO/PO:</b> Diana Bailey
<b>Activity Type:</b> IV.A.1. Preliminary Assessments		<b>Created On:</b> 02/11/99
<b>Task:</b> Federal Facility PA Review		<b>Priority:</b> High
<b>General Task Description:</b> Conduct Federal Facility PA Review on currently owned Fed. Fac. under DOD/Army		<b>Staffing:</b> Dedicated and Non-Dedicated
<b>Estimated Cost:</b> \$9,000.00		<b>Estimated Completion Date:</b> 04/23/99
<b>Estimated Hours:</b> 180		
<b>Dedicated:</b> 180		
<b>Non-Dedicated:</b> 0		

**Specific Element(s):**

- Coordinate activities with RPM/OSC
- Complete PA-Score Sheets
- Obtain and review existing site facility and/or release data provided by EPA
- Make recommendations and provide options to EPA as to further response action
- Review EPA files for background information
- Meet w/ EPA prior to issuance of site-specific TDD

**Acceptance Comments:** - Signed by Jamie Sotomayor/START on 02/11/99 07:28:47 AM, according to /START

**Accepted by:**



Robert C. Overfelt/START

02/11/99

Signed On:



# ecology and environment, inc.

International Specialists in the Environment

Cloverleaf Building 3, 6405 Metcalf  
Overland Park, Kansas 66202  
Tel: (913) 432-9961, Fax: (913) 432-0670

February 26, 1999

Ron Stewart—START Contract Officer  
United States Environmental Protection Agency  
Region 7  
726 Minnesota Avenue  
Kansas City, Kansas 66101

**RE: START Contract Region 7  
Request for Conflict of Interest (COI) Determination  
St. Louis Army Ammunition Plant, St. Louis, Missouri  
TDD Number: S07-9902-008**

Dear Mr Stewart:

1. In accordance with Clause H.16 and H.21 entitled respectively, "Organizational Conflicts of Interest" and "Contractor Disclosure Requirements for Conflict of Interest," the February 1990 EPA direction for Contractor Disclosure Requirements, and E & E's COI Plan, E & E hereby requests a determination with regard to performing START services at the St. Louis Army Ammunition Plant in St. Louis, Missouri. The US Army is listed on the TDD as the site owner. The Region 7 START has been tasked to perform a federal facility PA review of this site.

2. Nature of Work Performed by E & E Corporate:

Over the last three years E & E has had contracts with the following branches of the US Army Corps of Engineers (USACE):

USACE Kansas City; USACE Alaska; USACE Baltimore; USACE Europe; USACE Fort Worth; USACE Jacksonville; USACE Mobile; USACE Sacramento; USACE Savannah; USACE Seattle; and USACE Tulsa.

These contracts have expired, however, we can still be tasked to do work under existing task orders.

3. Contract Value/E & E Gross Revenues:

The total project value from these contracts over the last three years is \$24,997,306.71.

E & E's gross revenues for the past three fiscal years were as follows:

- 1998—\$75.0 million
- 1997—\$68.0 million
- 1996—\$70.0 million

4. Consultations:

The COI Coordinator, Olga Ortiz, and Principal Staff Attorney, Linda Zablotsky-Hurst, have conferred on this matter with the COI Officer Designee/Senior Vice-President, Laurence Brickman, and Region 7 START Program Manager, Robert C. Overfelt.

5. E & E's COI Plan, as applicable to the Region 7 START contract, is on file with EPA. No further changes are submitted herein.
6. E & E employs a central organization to search, identify, and resolve COI matters. It is the duty and responsibility of the Program Manager and each respective Department Supervisor to bring suspected COI matters to the COI organization for evaluation and subsequent disposition by the Executive Vice President, or his designee.
7. No significant change in control or ownership of E & E has taken place since any original submission of information for responsibility determination.
8. E & E does not believe that its past relationship with the US Army poses a potential conflict of interest, as E & E has not been tasked to perform work at the St. Louis Army Ammunition site and there are no current contracting vehicles whereby E & E could be tasked to perform work for the US Army at that site. We are, however, reporting this information in this letter to you in the interest of full disclosure.
9. Should you have any further questions, please contact me at (913) 432-9961.

Respectfully submitted,



Robert C. Overfelt  
Region 7 Program Manager

cc: Paul Doherty, START PO, USEPA Region 7,  
O. Ortiz, COI Coordinator, E & E, Buffalo

**PUBLICATION TRACKING FORM**  
(To Be Completed By Project Manager/Author)

PROJECT TITLE/SITE NAME: Fed. Fac. PA review for St. Louis Army Ammunition Plant JOB NO.: KJ7104  
 PROJECT MANAGER/AUTHOR: Martha Kopper TDD NO.: 07-99-02-0008  
 PROJECT DIRECTOR/STARTL: Patty Roberts PAN NO.: 1165 SH T6 FF  
 TECHNICAL EDITOR: Gary Haden NATURE OF DOCUMENT: Draft PA Review  
 PEER REVIEWER: Dave Kinroth WORD PROCESSOR: Tom Whitfield  
 GRAPHICS: Brooke B. DUE DATE: \_\_\_\_\_

STEP	LIST ALL REVIEWERS/WORD PROCESSORS IN PREFERRED SEQUENCE	DATE SUBMITTED	DATE REQUIRED	REVIEWED BY/TYPED BY	
				INITIALS	DATE
1	<u>Dave Kinroth</u>	<u>4-20-99</u>	<u>ASAP</u>	<u>MDK</u>	<u>4-20-99</u>
2	<u>Martha Kopper</u>	<u>4-20-99</u>	<u>ASAP</u>	<u>MR</u>	<u>4-22-99</u>
3	<u>Gary Haden</u>	<u>4-22-99</u>	<u>ASAP</u>	<u>HLN</u>	<u>4-29-99</u>
4	<u>Patty Roberts</u>	<u>4-29-99</u>		<u>PSR</u>	<u>4-30-99</u>
5					
6					
7					
8					
9					
10					

**PREFERRED FINAL APPROVAL STEPS**

11	Project Director/STARTL Approval			<u>PSR</u>	<u>4-30-99</u>
12	Word Processor/Finalize/Format/Put on Letterhead			<u>PSR</u>	<u>4-30-99</u>
13	Project Director/STARTL Sign-off (Gives to support staff to make copies)			<u>PSR</u>	<u>4-30-99</u>
14	Word Processor Sign-off (Copies and Sends Out)			<u>PSR</u>	<u>4-30-99</u>

**PRIORITY LEVEL:**

	<b>1+</b>	<b>1</b>	<b>2</b>	<b>3</b>
Please circle appropriate number and initial in the space provided.				

**SPECIAL INSTRUCTIONS:**

AOC Description Attached?

STARTL/ASTARTL Initials (Draft AOC)?

Spell Check? Dates? Done 4/20/99

Copies Made? Number?

Other Instructions:

DATE FILED: 7-2-99

**PUBLICATION TRACKING FORM**  
(To Be Completed By Project Manager/Author)

PROJECT TITLE/SITE NAME: <u>SLAAP</u>	JOB NO.: <u>K57104</u>
PROJECT MANAGER/AUTHOR: <u>Hopson/Roberts</u>	TDD NO.: <u>9902-008</u>
PROJECT DIRECTOR/STARTL: <u>Crescent</u>	PAN NO.: <u>1165 SITE EFF</u>
TECHNICAL EDITOR: <u>Hopson</u>	NATURE OF DOCUMENT: <u>MEMO</u>
PEER REVIEWER: <u>Roberts</u>	WORD PROCESSOR: <u>Pam Warfield</u>
GRAPHICS: <u>Brown</u>	DUE DATE: _____

STEP	LIST ALL REVIEWERS/WORD PROCESSORS IN PREFERRED SEQUENCE	DATE SUBMITTED	DATE REQUIRED	REVIEWED BY/TYPED BY	
				INITIALS	DATE
1	<u>Pam Warfield</u>	<u>4-30-99</u>	<u>4-30-99</u>	<u>GDW</u>	<u>4-30-99</u>
2	<u>Patty Roberts</u>				
3					
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10					

**PREFERRED FINAL APPROVAL STEPS**

11	Project Director/STARTL Approval				
12	Word Processor/Finalize/Format/Put on Letterhead				
13	Project Director/STARTL Sign-off (Gives to support staff to make copies)				
14	Word Processor Sign-off (Copies and Sends Out)				

**PRIORITY LEVEL:**

Please circle appropriate number and initial in the space provided.

1+

1

2

3

**SPECIAL INSTRUCTIONS:**

FORMAT

AOC Description Attached?

STARTL/ASTARTL Initials (Draft AOC)?

Spell Check? Dates?

John 4-30-99

Copies Made? Number?

Other Instructions:

**DATE FILED:**



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Overland Park, Kansas 66202

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## MEMORANDUM

TO: Paul Doherty, EPA/START PO

FROM: Martha Kopper, E & E/STM *AK for*

THRU: Robert C. Overfelt, CPG, E & E/START PM *PSR*  
*fn*

DATE: April 30, 1999

SUBJECT: Draft Federal Facility Preliminary Assessment Review for St. Louis Army Ammunition Plant at 4800 Goodfellow Boulevard, St. Louis, Missouri.

CERCLIS ID: MO4210021222

TDD: S07-9902-008

PAN: 1165SLTGFF

EPA/FFSE: Diana Bailey

## INTRODUCTION

The Ecology and Environment, Inc. (E & E), Superfund Technical Assessment and Response Team (START) was tasked by the U. S. Environmental Protection Agency (EPA) Region 7 Federal Facility Special Emphasis (FFSE) program to conduct a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Preliminary Assessment (PA) review of the St. Louis Army Ammunition Plant (a.k.a. SLAAP, formerly part of the St. Louis Ordnance Plant) located at 4800 Goodfellow Boulevard, in St. Louis, Missouri.

The specific elements of this task included a file review, assessing the sources and pathways of any contaminants for the entire site, listing data gaps and completing a PA score for the SLAAP facility. These tasks were achieved through a review of available information, interviewing State representatives knowledgeable of the site, and completion of the PA scoring worksheets and Hazard Ranking System (HRS) scoring deficiency checklist. Available file information included an Environmental Baseline Survey

(EBS) report completed by Tetra Tech EM Inc. (Tetra Tech) for the U.S. Army Aviation and Missile Command in Huntsville, Alabama, which, however, did not contain CERCLA PA or Site Inspection (SI) reports for review. The only sampling information consisted of investigations concerning the remediation of the interior of Building #3 (contaminated with polychlorinated biphenyls [PCBs]) and the removal and remediation of underground storage tanks (USTs) located east of Building #3. Due to the limited information and sampling conducted for the site, the most conservative approach was evaluated for PA scoring. Attachments 2 and 3 include the PA scoresheets and HRS scoring deficiency checklist.

## **SITE DESCRIPTION/LOCATION**

The SLAAP facility is located at 4800 Goodfellow Boulevard, in the city of St. Louis, Missouri. The geographic coordinates are latitude 38°41'.53" N , and longitude 90° 5' 48" W.

The SLAAP facility is situated on Goodfellow Boulevard, south of I-70, and west of Riverview Boulevard in an industrial area (Attachment 1: Figure 1, Site Location Map). Goodfellow Boulevard runs north to south, and I-70 runs east to west in relationship to the site. To the south of the site are a number of warehouses, which, at one time, were part of the St. Louis Ordnance Plant (SLOP). One of the warehouses, owned by PURO Chemical Division, presently stores unknown bulk chemicals. Residential properties and commercial shops, (previously a part of the SLOP operations) are located approximately 250 feet to the west of SLAAP. A school, formerly on property operated by SLOP is located about 500 feet southwest of the SLAAP property. The site is totally enclosed by a fence and two gated entrance ways.

The SLAAP facility is currently inactive. This approximately 21-acre complex consisted of 11 buildings (Attachment 1: Figure 2, Site Map). Presently, the property has eight unoccupied buildings that were used to house the main operating processes of the SLAAP facility. Buildings/structures removed from the facility include #7A (cooling tower), #8 and #8A (fuel oil storage area and oil pump house), #9 and #9A (acetylene generator and calcium carbide storage buildings), as well as buildings #9C and #9D (AST diox oxygen receiver and diox oxygen convertor). Two underground storage tanks (USTs), one located east of the Machining Building (#3), and the other located southwest of the Forge Building (#2) have also been removed. In addition, three quench oil tanks and a sludge pit have been removed from Building #10 and two former billet storage yards adjacent to Building #1 are now paved parking lots. For the locations of the former buildings/structures, see Attachment 1, Figure 2.

Drainage from the operating facility was via sanitary/storm sewer drains which entered the Metropolitan Sewer District (MSD) system, which in turn flowed into the Mississippi River. It has been reported that a number of the buildings contained subfloor drains, pits, and catch basins, which discharged into the MSD system. The site is nearly level, but is located near a topographic high point. Water flows to the north with lesser gradients to the east, west, and south. Rainwater that falls on the property eventually discharges to the St. Louis combined sewer system. No surface water is present on the SLAAP site. The closest body of water is the Mississippi River, which is about 2.65 miles from the SLAAP property.

## **OPERATIONAL HISTORY AND WASTE TYPES**

The following information was obtained from available files and the EBS report. It comprises past and present operational history and waste types. Some waste treatment, storage and disposal practices conducted at the former SLAAP facility are still unknown at this time.

The SLAAP facility, composed of about 21 acres in the northern portion of SLOP was purchased in 1941 (the same year SLOP began its operations). The St. Louis Ordnance Plant covered 276 acres, which included land to the west and south of the present SLAAP location. The mission of SLAAP was to manufacture 0.30-millimeter (mm) and 0.50-mm (.50 caliber) munitions (from 1941 to 1944) and 105-mm howitzer shells (from 1944 to 1945) for World War II needs. The buildings constructed for the initial production included Buildings #3, #5 and #9. After World War II, SLAAP was placed on standby status. During the reactivation from 1951 to 1954 and from 1966 to 1969 the plant was again used to manufacture 105-mm howitzer shells for the Korean and Vietnam Wars. Buildings added for this production included #1, #2, #4, and #7 through #11. Subsequent to 1969, the SLAAP facility operations were placed on hold. In 1984, buildings at SLAAP were renovated for use by the U.S. Army Aviation Systems Command (AVSCOM). In 1985, portions of Buildings #3, #5 and #6 were made into offices. In 1989, the Department of the Army determined that SLAAP was not needed to support its munitions program, and had the production equipment removed. From 1986 to 1990, SLAAP was under the command of the U.S. Armament, Munitions and Chemical Command (AMCCOM). In 1990, plant ownership and control were placed under U.S. Army Aviation and Troop Command (ATCOM). As of 1993, plant maintenance and surveillance activities were being subcontracted by Donovan Construction company to Plant Facilities and Engineering (PFE), Inc. The facility is currently vacant and under the control of AMCCOM.

As a function of national security, an underground tunnel network was constructed in order to transport materials, equipment, and munitions. Workers would also conduct test firing of the munitions manufactured

at the facility within the tunnels. It has been reported that the tunnel network encompasses the entire St. Louis Ordnance Plant, including the former SLAAP site.

The billet-cutting processes (Building #1) consisted of utilizing acetylene gas torches to nick and break the steel rods or billets into measured lengths. These cut rods/billets, stored in nearby shelters, were then transferred to Building #2 (Forge Building). The Forge building contained 10 gas- and oil-fired rotary furnaces, which were used from 1944 to 1969. Industrial processes within the Forge Building involved the slug heating, metal forging/shaping of the steel billets into projectiles. Once shaped, the projectiles were cooled in spray and quench operations and then transported to Building #3. Other machinery used in producing the projectiles included piercing presses, sizing and descaling units, hydraulic draw benches, conveyors, accumulators, air hammers, cooling tanks, oil heaters, cranes, metal grinders, transformers, air compressor motors and cylinders. Possible hazardous materials used in this building included: hydraulic and fuel oils, solvents (toluene), quench-water cooling oil, and machine lubricant oils.

The manufacturing operations within the machining building included shell shaping, heat treating, metal treating/cleaning/stripping/preservation, painting and packaging. Once the projectiles were completed in building #3, the primers were added in Buildings #5 and #6. Machinery used in these processes included lathes, welding equipment, hydraulic presses, drill presses, milling machines, grinders, heat treating furnaces, wash racks, welders, shapers, shot blasting equipment, paint spray booths, transformers, air compressors, dust collection devices, and conveyors. Machine, electrical, carpenter and automotive shops were also housed in this building. The first floor of the building was used to store hazardous wastes (chemicals, oil and greases) produced during these operations. Possible hazardous materials used in this building included cutting oil (or "soluble oil"- containing PCBs), quench oil (No. 6 fuel oil), hydraulic oil, and solvents (toluene).

Building #4 (Air Compressor Building) formerly housed air compressor operations. It was reported by Tetra Tech that an electrical switching room containing two transformers was also located within the building just south of the air compressor room. Hazardous materials generated may include hydraulic and motor oils, and PCBs. Industrial operations, which occurred in Building #5, included a primer loading plant for 0.30 and 0.50 caliber munitions from 1941 to 1944. From 1962 to 1967, the building was converted to an office building and was leased to Futura Manufacturing Company for the production of small radios. No information was available regarding the waste generated from Futura operations. However, during the 1940s, possible waste generated included hydraulic oils, cleaners, transformer oils, and ballasts.

Industrial operations that took place within the laboratory building (Building #6) included small arms primer insertion and metallurgical laboratory research. Operations conducted in the laboratory included polishing, measuring, quality control and metal etching. Liquid wastes were disposed down the MSD drains. Subsequent to this time period, the building was converted to office space. Possible hazardous materials used included unidentified laboratory chemicals, solvents, hydraulic oils, cleaners, transformer oils and ballasts.

The main purpose of Buildings #7 and #7A was to house water pumps and circulate coolant water between Buildings #2 and #4. No hazardous materials were identified as being used at these buildings.

The Fuel Storage Area (Building #8) industrial operations included storage and transportation of fuel used by the rotary furnaces and process machinery in Building #2 from 1944 to 1969. Fuel was transported by pumps located in Building #8A into Building #2. Underground fuel lines originally ran from nine 16,000- to 19,000-gallon above ground fuel/oil tanks positioned within earthen dams located directly north of Building #2. In 1958 (as a result of I-70 construction), the fuel/oil tanks were relocated east of Building #2. An oil drain sump, which was located near the fuel storage tanks was used to temporarily store dirty return oil from Building #8A oil pumps. In 1986, the tanks were removed and donated to the state of Missouri. Possible hazardous materials included fuel oil, which was possibly contaminated with PCBs. Based on knowledge of standard operating procedures of other government facilities in St. Louis during this time frame, it is common knowledge that reused/recycled fuel and heating oil were purchased, and these may have contained PCBs.

The Acetylene Generation Area (Buildings #9 to #9D) industrial operations included the production of acetylene gas in four generators located in Building #9 by combining calcium carbide and water. The gas was then piped underground to Buildings #2 and #3 for various operations, including billet nicking. Calcium hydroxide slurry, a caustic byproduct of this process, was stored in two sludge pits south of Building #9. Records indicated that this slurry was transported off-site by contractors. Possible hazardous materials located in this vicinity include calcium carbide, machining cooling oil and sludge.

Building #10 consisted of quench oil storage tanks, a sludge pit and two gasoline tanks, which were used as support of the industrial processes of the plant. The tanks were used to supply cooling oil (#6 bunker fuel oil) to 14 quench oil tanks for metal machining operations within Building #3 through underground and basement piping. All of the USTs and pit were removed in 1993. Approximately 1,500 cubic yards of contaminated soil were excavated after this removal. The EBS report noted that the USTs removal at the SLAAP site has not been closed. This is a result of Missouri Department of Natural Resources' (MDNR)

having outstanding issues (remaining contamination) regarding the UST final closure report. Possible hazardous materials in this area included quench oil, hydraulic oil, solvents (toluene), PCBs and heavy metals.

The Foamite Generator Building (Building #11) were used as support in the industrial processes of the plant. Foamite was generated in this building in order to fight fires at the SLAAP. Hydrolysate and ferric hydroxide and dry foamite powder were used in this generation process. No hazardous materials were reported to have been used in this operation.

The existence of tunnels that run the full length and width of the SLOP has been documented by MDNR and former ATCOM industrial hygiene staff. There were many purposes for these tunnels: national security, practice firing range and possible explosives detonation range, transferral of materials, supplies, equipment, and projectile/casing/shell production between buildings, and a mode of transportation by the more than 34,000 SLOP workers. Standing water within the tunnels was observed by former ATCOM staff. There is no knowledge at this time of any ground water or soil samples having been analyzed for contamination. Former ATCOM staff recommended that respiratory protection was necessary if the tunnels were to be entered.

Toxic or hazardous materials used and stored at SLAAP included thinners (toluol- at a usage of 45,000 liters per month), enamel (TT-E-516-at a usage of 159,000 liters per month), primer (MIL-P-22332A- at a usage of 36,000 liters per month), phosphoric acid (at a usage of 2,500 liters per month), sulfuric acid and various types of oil and grease waste. One document reported that this facility used about 4,400 gallons of oils and greases per day.

Pesticides were reportedly applied by a contractor. Those chemicals used included Rid-A-Bird (containing Fenthion and Avitrol with 4-aminopyridine), Malathion and the herbicide 2,4,5-T Ester. A Dames and Moore report in 1994 indicated finding additional pesticide contamination (other than what was originally identified). These two findings bring into question whether pesticides were merely applied or actually stored on SLAAP.

The U.S. Army Toxic and Hazardous Material Agency's, 1979 report noted that all sewage was discharged into the MSD system. Contaminated liquid and solid industrial wastes was collected in all sumps and holding tanks and was reportedly removed by a contractor (or possibly discharged to the MSD). Some of the sumps/drains were located next to the MSD sewer lines. No burials were reported at SLAAP, and no demolition or burning ground areas are on this facility. The documents also noted that no holding or

settling ponds or waste-water lagoons were on this site, but that collection sumps were common. The report also noted that though there were no records which indicated large spills of industrial chemicals or petroleum products, there was evidence of minor spills near valves, joints and piping. This document does not report the volume of contaminated liquid and solid industrial wastes collected in sumps and holding tanks that was removed by contractors. Little file information is available regarding MSD communications and permits. One MSD memo dated October 1966 noted poor housekeeping maintenance of Building #2 subfloor pits and drains which led to MSD sewer lines. No MSD permits were held until after the late 1960s. For the SLAAP facility, there did not appear to be any records of noncompliance related to an MSD permit.

SLAAP was a small quantity waste generator under RCRA until December 31, 1997, when the Army deactivated its RCRA status.

## **PREVIOUS INVESTIGATIONS**

Investigations have been conducted at the site for the remediation of Building #3 and the removal of the USTs (Building #10). The following information was obtained from available files.

Previous investigations of Building #3 pertain strictly to the building itself. Building #3 was originally utilized to finish metal projectile parts as a part of the munitions operations. Metal lathing operations were conducted on the second floor and metal finishing operations were done on the first floor. Both metal lathing and metal finishing operations utilized oil-cooling systems in order to reduce heat. Cutting oils with PCBs exhibited excellent heat transfer qualities and were historically used extensively in similar industrial applications. The specific cutting oil used at SLAAP is not known. An unconfirmed estimate by plant personnel of the PCB content in the cutting oil is that it contained between 50 to 150 parts per million (ppm).

AVSCOM had planned to renovate Building #3 into office space in the 1980s. The following investigation was a result of this renovation effort. On April 24, 1990, Larry Wright, director, Administrative and Installation Support, Department of the Army, AVSCOM sent a letter to Bob Jackson, Toxic Substance Control Section, USEPA Region 7, regarding the removal/disposal by Browning Ferris, Inc. (BFI) of creosote treated wooden blocks that had been exposed to PCBs. In the correspondence, it was noted that General Services Administration (GSA) samples revealed a maximum of 288 ppm of Aroclor 1248 and that notice had been made to MDNR and EPA on April 6. The letter also outlined the short term and long term plan of action, which included removal of all concrete, mastic and wooden blocks, enclosure

of file storage area, placement of masonite as a floor, and sampling of concrete subfloor and permanent flooring installation. EPA's May 9, 1990 response letter from Jackson recommended that contaminated areas be sampled and cleaned for future use and that compliance with 40 CFR Part 761 be accomplished with respect to disposition of contaminated equipment.

On January 2, 1991, Bob Kraeger of MDNR inspected Building #3. During this inspection, Kraeger took 16 wipe samples from various surfaces within the building. The results indicated that nine of the 16 samples had regulated levels of PCBs. No samples of the earthen floor or surrounding soils were taken. Subsequently, on February 20, 1991, EPA issued a Notice of Noncompliance TSCA Docket Number VII-91-T-304 for noncompliance with the National Spill Clean-Up Policy (40 CFR 761.125). EPA required that AVSCOM provide documentation of the removal of all contaminated flooring materials, and decontamination/confirmation sampling of nonporous surfaces to less than 10 micrograms/100 square centimeters, and decontamination/confirmation sampling of porous surfaces to less than 10 ppm. On March 20, 1991, AVSCOM responded to the Notice of Noncompliance by noting how it would accomplish the remediation. In a letter dated May 28, 1993, Jackson of EPA to AVSCOM, Jackson outlined three additional areas that EPA believed should be addressed. Those areas included : 1) remediation of the chip chute wall, chip chute and basement, 2) encapsulation of an area within Building #3, and 3) statistically based sampling of contaminated areas. On June 24, 1996, US AVSCOM submitted to the EPA, Toxic Substances and Control Section a Health Based Risk Assessment (completed by Woodward-Clyde) for Building #3 as a portion of the requirements for the PCB remediation project as a result of the Notice of Noncompliance. In August 15, 1996, the Agency For Toxic Substances and Disease Registry (ATSDR) issued a Health Consult as a result of the Health Based Risk Assessment. This report documented PCBs located in the basement, first and second floors, and asbestos and pesticides in the basement. Soil and wipe samples taken by Dames and Moore (1994 study) from various surfaces in the basement detected 4,4'-DDD, 4,4'-DDT, endrin and gamma-BHC, dieldrin, heptachlor epoxide, and endrin aldehyde. ATSDR concluded that PCB levels (including soils in the basement) within Building #3 may represent a long-term health threat to future workers from direct contact exposures. They also concluded that the pesticides detected in soil samples did not represent a health threat. ATSDR recommended that the risk assessment completed by AVSCOM may not be representative of current conditions in Building #3.

The SLAAP facility had four known areas where USTs were located; east, north and west of building #2 and east of building #3. No information was available regarding the 1958 and 1986 removal of fuel tanks located north and later relocated east of the #2 Forge Building. However, information pertaining to the USTs east of Building #3 was available. Two previous studies were conducted of this site: "Investigation

of Underground Storage Tanks," September 1989 by the United States Corps of Engineers and "Underground Storage Tank Investigation," February, 1992 by J.D. Chelan.

The tanks east of Building #3 were reportedly taken out of service when munitions production was terminated in 1969. These tanks were drained of all product and filled with water. The J.D. Chelan report (in support of removal of the USTs east of Building #3) reported drilling 12 boreholes in the vicinity of the USTs in December 1991. From the report, it appeared that soil and tank media contents were sampled on December 11, 1991. The tanks contents were analyzed (for all but tank #105) for PCBs, metals and TPH. Soil samples were analyzed only for TPH and metals. Analytical results for tank contents and soils indicated that TPH was in excess of the cleanup levels. Analytical results for the tank contents indicated that PCBs levels were reported at less than 5.0 ppm for the sludge pit. All other PCB levels for all other tanks were reported at less than 0.001 ppm. This report also noted a black oil stain near Tank #17, however, no sample was taken. One soil sample collected from an unconnected pipe north of tank #105, which contained a red "solvent-like" material, had BTEX compounds at a concentration of 477,200 ppm. The report concluded that with the worst contamination in the UST area appeared to be between Tanks #17 and #87, at the southwest end of Tank #15, and around Tank #105.

A removal conducted by the remediation contractor, Action Environmental Services (from November 1992 through January 1993) included the removal of two gas tanks, #101 and #105, a sludge pit, and three quench oil tanks (#15, #17, #87). From the removal activities, a total of 1,500 cubic yards of soil were excavated and disposed in a landfill. Excavation of the soil was terminated by the remediation contractor at the contractual 1,500-cubic-yard quantity. During this removal, no free product, soil discoloration or odors were encountered. Dark-colored liquids were reported in one borehole of a closure sample. Seven soil samples, which were analyzed for benzene, toluene, ethylbenzene, xylene (BTEX) and TPH, resulted in BTEX and TPH elevated concentrations. No additional contamination was noted from any additional Resources Conservation and Recovery Act (RCRA) TCLP metals analyses. Soil samples were not analyzed for PCBs. It was reported during the removal that no leakage was found to have accumulated against the building #3 foundation or along sewer lines beneath the tanks. It was noted however, that spillage of other contaminants unrelated to the UST removal was present in the excavations.

The US AVSCOM submitted to MDNR a Corrective Action Plan in April 1993 in order to finalize the tank removals. MDNR's response letter indicated concerns over remaining contamination. As a result, closure of the SLAAP USTs is pending.

In February 1999 Tetra Tech conducted an EBS for the AMCOM in Huntsville, Alabama. The EBS was prepared to determine the environmental conditions of the property for consideration for acquisition, transfer, outgrant, or disposal. The scope of work for the EBS consisted of the identification of probable areas of environmental concern that may be present on site or on the surrounding adjacent properties and that may pose an environmental liability for the resulting property owner. The EBS identified several areas of environmental concern throughout the property. Sampling recommendations were also addressed in the EBS to assess the site-wide areas of environmental concern.

## **SOURCE AND PATHWAY ASSESSMENT**

A PA score for the SLAAP site at 4800 Goodfellow Boulevard was calculated utilizing the computerized scoresheets (Version 2.1) dated April 1995. An overall PA score of 10 was calculated for this site. The ground water and surface water pathways scored a 1, and were believed to pose no threat to the environment and/or human health. The soil exposure pathway scored 2, with a potential exposure threat for nearby residential targets suspected. The air pathway scored a 20 based on no suspected release. The relatively high score for the air pathway is due to the dense population within close proximity of the site. The PA score was based on readily available file information, a limited target survey, and professional judgement. Missing file information and HRS scoring deficiencies are highlighted separately in Attachment 3: HRS Scoring Deficiency Checklist.

## **SOURCE DESCRIPTION**

Limited information exists for the site concerning waste treatment, storage, and disposal practices since its inception as an munitions plant in 1941. Additional wastes may be present and waste quantity could be much higher at the site. Other potential source areas were identified during the file review and will be discussed below. Further sampling would be necessary to adequately document source areas at the SLAAP site. The EBS conducted by Tetra Tech resulted in identifying building-specific areas of environmental concern throughout all remaining buildings on site. Site-wide areas of environmental concern were also identified during their survey and consisted of possible ground water contaminant migration from the PURO Chemical storage facility located south of the site, as well as possible asbestos-containing materials and lead-based paint present in many buildings across the site. The EBS report addressed sampling recommendations to assess the site-wide and building-specific areas of concern. START believes that its assessment and recommendations were good. Additional sampling in the areas of concern, noted in the EBS report, would help in determining whether any environmental/human health concerns exist for the site.

Potential sources identified at the site and used for PA scoring include the former fuel oil storage area (Building #8), the former quench oil tanks and sludge pit area (Building #10), and the former sludge pit area located adjacent to Building #9. These buildings no longer exist at the property and removal activities have occurred at Buildings #8 and #10, including some soil removal in the former quench oil tanks and sludge pit area near Building #10. Available records and interviews with State officials have indicated that the storage tank removals at the SLAAP site have not been officially closed. Previous analytical data has also indicated that a release to subsurface soils and possibly ground water has occurred in the area of the former Building #10. Many other potential source areas may exist across the site including potential PCB-contaminated soil beneath Building #3 near the former chip chute area. Including these potential source areas into the PA-score would not contribute to a higher waste quantity value unless waste stream volumes or hazardous constituent quantity could be estimated. This type of waste quantity information was not available for review. The potential source areas identified for PA scoring were based on available file information, limited analytical results, and professional judgement. Waste quantity as well as source delineation would most likely change after additional sampling has been conducted at the site.

START suggests that more extensive soil sampling throughout the site and mainly outside the buildings be conducted to adequately assess whether contaminant releases have occurred due to the former operations at the site. Field screening sampling could be conducted to assess potential source areas and to determine the extent of soil contamination for proper removal assessment. Confirmation samples would also be necessary to verify on-site screening samples. Soil sampling may be more extensive in some areas depending on the results of the field screening data. Additional potential source areas are listed below with sampling considerations for possible further work at the SLAAP site.

#### **Data Gaps**

- Surface and subsurface soils near several on-site buildings (especially, buildings #1 through #4) should be sampled for PCB contamination to adequately assess whether any contamination is present as a result of the former operations. Perimeter samples could be collected around the above mentioned buildings in a north, south, east, and west direction. PCB contamination is thought to be widespread across the site due to the documented processing use of PCB containing soluble oil and the presence of PCB contamination in Building #3.
- Surface and subsurface soils samples could be collected in the former area of the fuel oil storage area (Building #8) and north of Building #2 (fuel line area and off-loading pits). Although the area at Building #10 (quench oil tanks/sludge pit) has been remediated, residual soil contamination may remain in the area. A grid sampling design could be employed to characterize a preliminary areal and vertical extent of soil contamination in the designated area. This sampling design would aid in assessing amounts necessary for a removal action. Analysis should include VOCs, SVOCs, and metals.

- Soil samples that are collected around Buildings #1 through #4, and #8 through #10 should also be analyzed for VOCs, SVOCs, and metals to determine whether these constituents are present as a result of the building-specific operations.
- Surface and subsurface soil samples could be collected near Building #6 to determine whether any contamination (from the metallurgical laboratory processes) is present as a result of operations.
- Subsurface soil samples could be collected near the former Building #9 complex including the former sludge pit area (currently a parking lot) to determine if any contamination (from the acetylene gas production) is present in subsurface soils as a result of the operations.
- Subsurface soil samples would be appropriate to collect in the vicinity of gasoline UST areas (near Buildings #2 and #3). Total petroleum hydrocarbons should be included in the sample analysis.
- Surface and subsurface soil samples could be collected near Building #5 to determine whether any contamination is present concerning the operations of the Futura Manufacturing Company (producers of small radios from 1962 to 1967 ).
- Soil samples within the identified tunnel systems underlying the SLAAP property could be collected in order to determine if any contamination is present as a result of the munitions production operations. A full range of analytes (based on all the SLAAP/SLOP operations and processes) should be completed due to the varied usage and network of the tunnels. Residual contamination (explosives) remaining from the firing ranges within the tunnels should be included in the analyte list.

## **GROUND WATER PATHWAY**

A score of 1 was calculated for the ground water pathway. Previous investigations have indicated that total petroleum hydrocarbons (TPHs), metals, and PCB contamination in soils near the former quench oil tanks/sludge pit area (former Building #10). In addition, PCB contamination has been detected at elevated levels in Building #3 and it has been reported by MDNR that a portion of the basement in building #3 is earthen and may contain PCBs. Information from the EBS report has also indicated that contamination does exist within buildings and former building areas across the site. A former ATCOM industrial hygienist indicated that standing ground water was observed in the tunnel network beneath SLOP. This tunnel network was also reported by the ATCOM representative as being situated under the SLAAP site and that standing ground water (possibly perched ground water ) was observed within the tunnel. If the perched ground water is contaminated due to activities within the tunnel, a potential to release to the shallow aquifer may be occurring. The aquifer underlying the site is the Mississippian aquifer and the top of the water table is thought to be about 65 feet below ground surface (bgs).

Additional soil sampling needs to be conducted to adequately documented waste quantity and source areas throughout the site. No primary targets were evaluated for the ground water pathway. Ground water targets within a 4-mile radius are considered secondary targets. Currently, only two private wells at depths of 340 feet and 380 feet bgs were identified by the State and are located about 3 miles from the SLAAP site. No municipal wells are located within a 4-mile radius of the site.

### **Data Gaps**

Even though the exposure threat is minimal for ground water targets, due to the limited number of drinking water targets, a few shallow ground water samples could be collected at the site to document ground water contamination (if present) and to attribute ground water contamination to a source. The EBS report indicated a total of three monitoring wells to be installed at the site including: one upgradient well installed at the western property boundary, another upgradient well along the southern property boundary, and one on-site monitoring well near the former Building #10. START suggests that an additional three-four monitoring wells should be installed across the site and near identified source areas. Ground water releases near several buildings (ie., Buildings #8 and #9) may be occurring due to the former building-specific operations. The installation and sampling of temporary Geoprobe wells could be utilized for ground water characterization. A thorough on-site geologic evaluation to determine the site's stratigraphy characteristics, including confining units should also be made.

### **SURFACE WATER PATHWAY**

A PA-score of 1 was calculated for this pathway with no suspected release to a surface water body evaluated. The closest surface water of significance is the Mississippi River, located about 2.65 miles downstream to the east of the site. Flooding is also not a concern at the facility, as it is thought to be located on a topographic high. The exposure threat to any potential targets along the Mississippi River would be low due to the distance of the Mississippi River (> 2 miles) and the high dilution factor of the river (> 10,000 cfs). Surface drainage from the site is collected by catch basins that eventually discharge to the St. Louis MSD system. File information was not found regarding historical compliance with MSD permits. The facility is currently inactive. No primary targets were evaluated.

## **Data Gaps**

Even though the exposure threat is minimal for surface water targets, an assessment to verify whether a site-related release has occurred should be made. The EBS report indicated sampling at direct discharge points from two areas within the buildings (ie. pits connected to the sewer system in Building #1). These discharge points warrant sampling as well as any other identified discharge points/outlets utilized during high rainfall events. These samples would verify contamination (if present) prior to discharging into the St. Louis MSD system. Sampling surface water targets (Mississippi River) does not appear to be warranted.

## **AIR AND SOIL EXPOSURE PATHWAYS**

A score of 20 was calculated for the air pathway and a score of 2 was calculated for the soil exposure pathway. The potential for a air release via the site is considered low. The air pathway score is relatively high due to the dense population within the vicinity of the site. The total population within 4 miles of the site, as determined by the Geographic Modeling System (GEMS) database is about 264,235. Approximately 17,928 people reside within a 1-miles radius of the site. Historically, emissions from furnaces situated in Building #2 may have caused soil contamination; however, the facility is currently inactive.

Limited analytical data exists for the site documenting soil contamination (0-2 feet). File information indicated soil contamination (BTEXs and TPHs) in the former quench oil tanks/sludge pit area at building #10; however, a cleanup and removal of soils has been conducted. Surface soil contamination is suspected in areas across the site. Additionally, due to the presence of tunnels underneath the SLAAP/SLOP facility, there is the potential for subsurface soils within this underground pathway to be contaminated as a result of the variety of usages. It should be noted that during the site visit conducted by Tetra Tech, no visible signs of surface soil contamination were identified. The majority of the facility is asphalt and concrete covered with about a total of 3 acres of grassy/soil areas.

Since the full extent of contamination has not been totally identified at the SLAAP site it is difficult to assess whether any residential targets are situated within 200 feet of contaminated source area. Residential properties do exist directly to the west and northwest. This area has been residential ever since the construction of the SLAAP facility in 1941. A school is located about 500 feet southwest of the site. These properties warrant sampling based on knowledge of the SLOP/SLAAP operations. There are no workers

currently on site; however, an EBS evaluation to determine environmental conditions at the SLAAP is being conducted for possible property transfer, acquisition, or disposal.

### **Data Gaps**

An evaluation of the underground tunnel network should be conducted at the site. This evaluation may warrant soil and air sampling to assess the environmental hazards of the tunnels. Surface soil samples (0-2 feet) should be collected within 200 feet of potential workplace areas to assess the exposure threat to any future on-site workers/residents of the property. These soil samples would also help in assessing source characterization. Residential targets (nearby homes and school) need to be further evaluated and may also warrant sampling.

### **CONCLUSIONS AND RECOMMENDATIONS**

Based on the available information, further action should be taken at the SLAAP site at 4800 Goodfellow Boulevard. Previous investigations as well as the EBS investigation have indicated potential areas of environmental concern within site buildings and in areas of former buildings. In addition, it has been reported that the facility had poor waste handling practices. Future work should include sampling in areas addressed in the EBS investigation to assess potential environmental liabilities associated with property transferrals. In addition, sampling outlined in this memorandum should be considered to better assess whether releases have occurred due to past operations and to identify the extent and migration of contamination. START recommends that surface and subsurface soil, surface water, and ground water sampling be conducted to confirm or deny the presence of contamination. Background samples for all media would also be needed to establish appropriate background concentrations. Sampling parameters should consist at a minimum, of volatile organic compounds (VOCs), semi-volatile compounds (SVOCs), total metals, PCBs, and pesticides. Explosives analysis may also be warranted. An evaluation of the tunnel network should be completed to assess whether any health concerns exist. These tunnels should be considered a part of the infrastructure of this site with respect to the environmental liabilities and subsequent remediation efforts.

A low PA-score of 10 was calculated for the site due to the limited number of targets. A low exposure threat appears to exist for ground water and surface water targets. The ground water pathway score would remain low due to the limited use of ground water as a drinking water source. An exposure threat to surface water is minimal due to the 2.65-mile downstream distance from the site and the high dilution factor of the Mississippi River.

In addition, a low exposure threat via air appears to exist; however an exposure threat may exist for any future workers/residents that may work/reside on the property. A better assessment of the exposure threat would be better assessed after the future land use of the property is determined and on-site sampling is conducted. Nearby residential properties may also warrant sampling due to the past operations at the site.

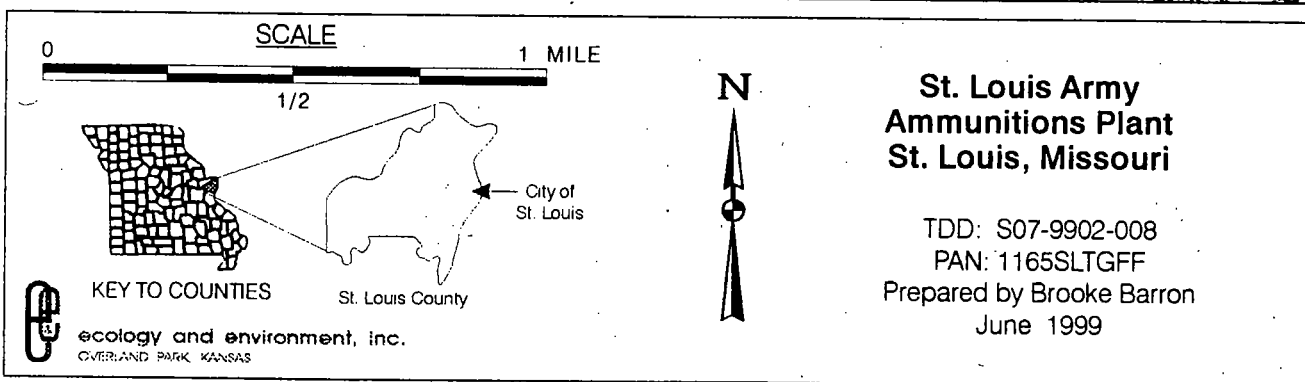
## **ATTACHMENTS**

1. Figures 1 and 2
2. PA Form and Scoring Worksheets with Reference List
3. HRS Scoring Deficiency Checklist

## **ATTACHMENT 1**

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**Figure 1 and 2**



STLSTLC.CDR

Figure 1: Site Location Map

Source: USGS 7.5 minute series,  
1971, Clayton, MO Quad,  
1982, Granite City, MO Quad.

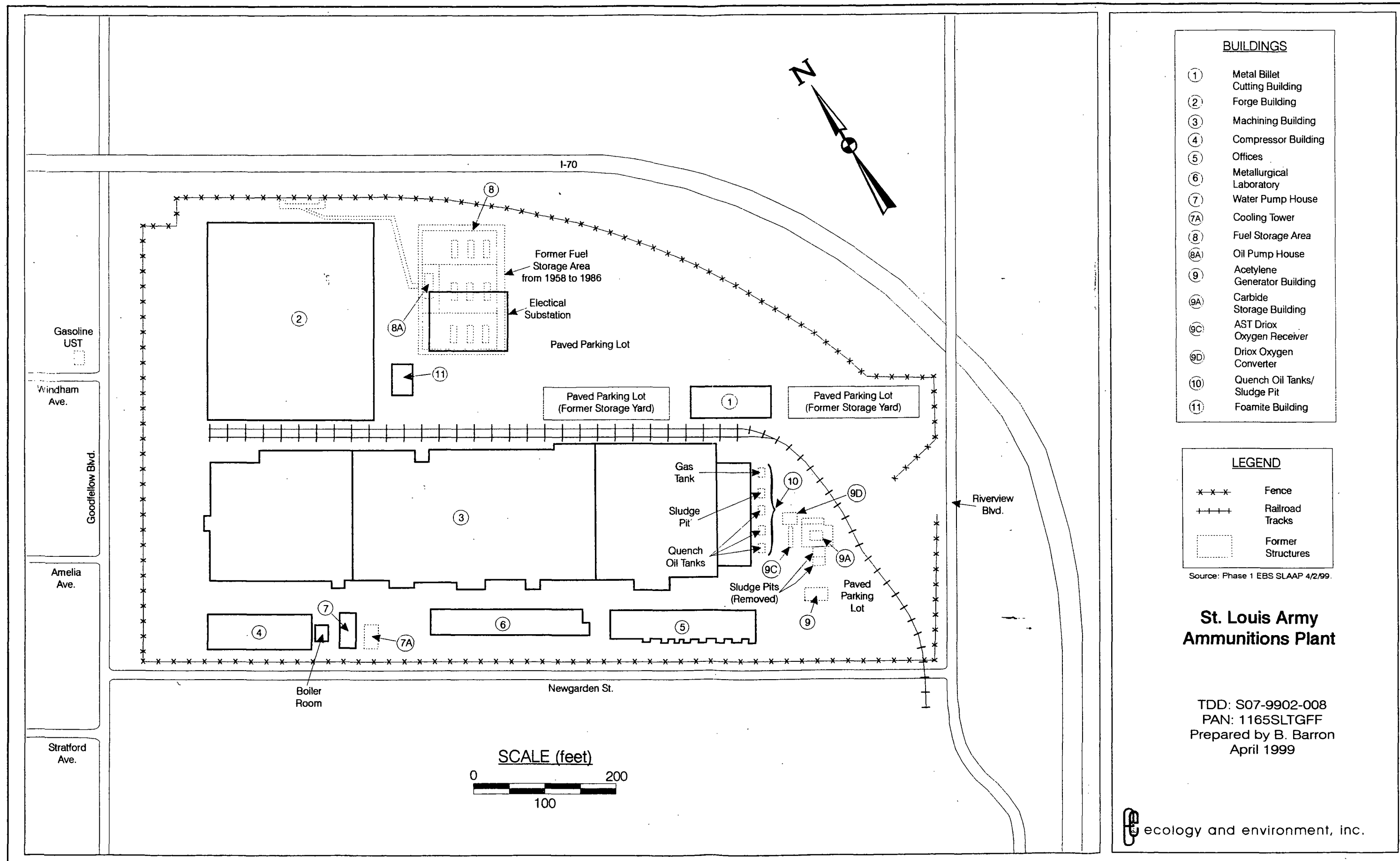


Figure 2: Site Map

## **ATTACHMENT 2**

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### **PA Form and Scoring Worksheets with Reference List**

**DRAFT**

PA-Score 2.1 Scoresheets  
St. Louis Army Ammunition Plant - 04/28/99

Page: 1

OMB Approval Number: 2050-0095  
Approved for Use Through: 4/95

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM				IDENTIFICATION		
				State: MO	CERCLIS Number: MO	
				CERCLIS Discovery Date: 06/01/84		
1. General Site Information						
Name: St. Louis Army Ammunition Plant			Street Address: 4800 Goodfellow Blvd.			
City: St. Louis		State: MO	Zip Code: 63120	County: St. Louis	Co. Code:	Cong. Dist:
Latitude: 38° 40' 11.5"    Longitude: 90° 15' 9.8"		Approx. Area of Site: 21 acres		Status of Site: Inactive		
2. Owner/Operator Information						
Owner: AMCOM			Operator: none			
Street Address:			Street Address:			
City: Huntsville			City:			
State: AL	Zip Code:	Telephone:	State:	Zip Code:	Telephone:	
Type of Ownership: Federal Agency			How Initially Identified: Federal Program			

PA-Score 2.1 Scoresheets  
St. Louis Army Ammunition Plant - 04/30/99

Page: 2

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM		IDENTIFICATION	
		State: MO	CERCLIS Number: MO
		CERCLIS Discovery Date: 06/01/84	
3. Site Evaluator Information			
Name of Evaluator: Martha Kopper		Agency/Organization: Ecology & Environment, Inc.	Date Prepared: 04-01-99
Street Address: 4358A Rider Trail North		City: St. Louis	State: MO
Name of EPA or State Agency Contact: Diana Bailey		Telephone: 913-551-7717	
Street Address: 726 Minnesota Ave		City: Kansas City	State: KS
4. Site Disposition (for EPA use only)			
Emergency Response/Removal Assessment Recommendation: No	CERCLIS Recommendation: Other	Signature:	
Date:	Date:	Name:	
		Position:	

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO
	CERCLIS Discovery Date: 06/01/84	

5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site: Industrial DOD Other Federal Agency:	Site Setting:  Urban	Years of Operation: Beginning Year: 1944  Ending Year: 1969
Type of Site Operations: Manufacturing Paints, Varnishes Industrial Organic Chemicals Primary Metals Metal Coatings, Plating, Engraving Metal Forging, Stamping Electronic Equipment Other Manufacturing  DOD RCRA Small Quantity Generator	Waste Generated: Onsite	
	Waste Deposition Authorized By: Present Owner	
	Waste Accessible to the Public No	
	Distance to Nearest Dwelling, School, or Workplace: 250 Feet	

6. Waste Characteristics Information

<table> <tr> <th>Source Type</th> <th>Quantity</th> <th>Tier</th> </tr> <tr> <td>Contaminated soil</td> <td>3.05e+04 sq ft</td> <td>A</td> </tr> <tr> <td>Contaminated soil</td> <td>5.34e+03 sq ft</td> <td>A</td> </tr> <tr> <td>Contaminated soil</td> <td>6.00e+02 sq ft</td> <td>A</td> </tr> </table>	Source Type	Quantity	Tier	Contaminated soil	3.05e+04 sq ft	A	Contaminated soil	5.34e+03 sq ft	A	Contaminated soil	6.00e+02 sq ft	A	General Types of Waste: Metals Organics Solvents Paints/Pigments Pesticides/Herbicides Acids/Bases Oily Waste Explosives Other:
Source Type	Quantity	Tier											
Contaminated soil	3.05e+04 sq ft	A											
Contaminated soil	5.34e+03 sq ft	A											
Contaminated soil	6.00e+02 sq ft	A											
Tier Legend C = Constituent    W = Wastestream V = Volume        A = Area	Physical State of Waste as Deposited Solid Liquid Sludge Powder												

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM		IDENTIFICATION	
		State: MO	CERCLIS Number: MO
		CERCLIS Discovery Date: 06/01/84	
7. Ground Water Pathway			
Is Ground Water Used for Drinking Water Within 4 Miles: No  Type of Ground Water Wells Within 4 Miles: Private	Is There a Suspected Release to Ground Water: Yes	List Secondary Target Population Served by Ground Water Withdrawn From:  0 - 1/4 Mile 0 >1/4 - 1/2 Mile 0 >1/2 - 1 Mile 0 >1 - 2 Miles 0 >2 - 3 Miles 5 >3 - 4 Miles 0 Total 5	
Have Primary Target Drinking Water Wells Been Identified: No	Depth to Shallowest Aquifer: 65 Feet		
Nearest Designated Wellhead Protection Area: None within 4 Miles	Karst Terrain/Aquifer Present: No		

<p>POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM</p>	IDENTIFICATION	
	State: MO	CERCLIS Number: MO
	CERCLIS Discovery Date: 06/01/84	

8. Surface Water Pathway

Part 1 of 4

Type of Surface Water Draining Site and 15 Miles Downstream: River	Shortest Overland Distance From Any Source to Surface Water:  13992 Feet 2.6 Miles
Is there a Suspected Release to Surface Water: No	Site is Located in: > 500 yr floodplain

8. Surface Water Pathway

Part 2 of 4

Drinking Water Intakes Along the Surface Water Migration Path: Yes		
Have Primary Target Drinking Water Intakes Been Identified: No		
Secondary Target Drinking Water Intakes:		
Name	Water Body/Flow(cfs)	Population Served
None	minimal stream/ <10	0
	Total Within 15 Miles:	0

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO
	CERCLIS Discovery Date: 06/01/84	

8. Surface Water Pathway	Part 3 of 4
--------------------------	-------------

Fisheries Located Along the Surface Water Migration Path: Yes

Have Primary Target Fisheries Been Identified: No

Secondary Target Fisheries:

Fishery Name	Water Body Type/Flow(cfs)
Mississippi River	large river/ >10000

8. Surface Water Pathway	Part 4 of 4
--------------------------	-------------

Wetlands Located Along the Surface Water Migration Path? (y/n) Yes

Have Primary Target Wetlands Been Identified? (y/n) Yes

Secondary Target Wetlands:  
None

Other Sensitive Environments Along the Surface Water Migration Path: Yes

Have Primary Target Sensitive Environments Been Identified: No

Secondary Target Sensitive Environments:

Water Body/Flow(cfs)	Sensitive Environment Type
large river/ >10000	Habitat for Federally designated endanger

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO
	CERCLIS Discovery Date: 06/01/84	

9. Soil Exposure Pathway

Are People Occupying Residences or  
Attending School or Daycare on or  
Within 200 Feet of Areas of Known  
or Suspected Contamination: No

Number of Workers Onsite: None

Have Terrestrial Sensitive Environments Been Identified on or Within  
200 Feet of Areas of Known or Suspected Contamination: No

10. Air Pathway

Total Population on or Within:	
Onsite	0
0 - 1/4 Mile	1607
>1/4 - 1/2 Mile	4337
>1/2 - 1 Mile	17928
>1 - 2 Miles	56371
>2 - 3 Miles	76785
>3 - 4 Miles	107207
Total	264235

Is There a Suspected Release to Air: No

Wetlands Located  
Within 4 Miles of the Site: No

Other Sensitive Environments Located  
Within 4 Miles of the Site: No

Sensitive Environments Within 1/2 Mile of the Site:  
None

**DRAFT**

OMB Approval Number: 2050-0095  
Approved for Use Through: 4/95

**PA-Score**

PA SCORESHEETS

Site Name: St. Louis Army Ammunition Plant  
CERCLIS ID No.: MO  
Street Address: 4800 Goodfellow Blvd.  
City/State/Zip: St. Louis, MO 63120

Investigator: Martha Kopper  
Agency/Organization: Ecology & Environment, Inc.  
Street Address: 4358A Rider Trail North  
City/State: St. Louis, MO

Date: 04-01-99

**DRAFT**

WASTE CHARACTERISTICS

Waste Characteristics (WC) Calculations:

- |  |                   |        |          |          |
|--|-------------------|--------|----------|----------|
| 1 #8/Fuel Oil Area   | Contaminated soil | Ref: 1 | WQ value | maximum  |
| Area   | 3.05E+04 sq ft    |        | 8.97E-01 | 8.97E-01 |
| <p>An open area surrounded by an earthen berm formerly contained 9 ASTs to store fuel oil for rotary furnaces in Building #2. Currently the area is a parking lot and electrical substation. Also use to be loading pits located west and east along north side of Building #2. An oil pump house and fuel line also were located in the area. The tanks and pump house and fuel line have been removed but residual soils are thought to remain in the area where Building #8 was once located. A potential contaminated soil area of about 30,500 square feet has been estimated for scoring purposes.</p> |                   |        |          |          |
| Ref: 1   |                   |        |          |          |
|  |                   |        |          |          |
| 2 #10/Oil Tanks/Pit  | Contaminated soil | Ref: 1 | WQ value | maximum  |
| Area   | 5.34E+03 sq ft    |        | 1.57E-01 | 1.57E-01 |
| <p>Building #10, formerly the location of a sludge pit and quench oil tanks remains a potential source area of concern. All tanks and pit were removed during a 1993 removal; however contaminated soil most likely remains in the area. BTEX compounds have been detected in the areas as high as 477,200 ppm. According to the EBS report this area (Building #10) remains a area of concern for MDNR. A no further action letter has not been issued by MDNR concerning this area. An approximate area of 5,340 square feet was estimated for scoring purposes.</p>                                       |                   |        |          |          |
| Ref: 1, 13   |                   |        |          |          |
|  |                   |        |          |          |
| 3 #9/Sludge Pits   | Contaminated soil | Ref: 1 | WQ value | maximum  |
| Area   | 6.00E+02 sq ft    |        | 1.76E-02 | 1.76E-02 |
| <p>Sludge pits used in the acetylene generation area (Building #9 &amp; #9A) constitute an area of concern. These sludge pits were used to store the byproduct caustic calcium hydroxide. Contaminated soils are thought to remain in the area and an area of approximately 600 square feet was estimated for scoring purposes.</p>  |                   |        |          |          |
| Ref: 1   |                   |        |          |          |

WQ total 1.07E+00

\*\* Only First WC Page Is Printed \*\*

Waste Characteristics Score: WC = 18

Ground Water Pathway Criteria List  
Suspected Release

Are sources poorly contained? (y/n/u)	Y
Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	U
Is precipitation heavy? (y/n/u)	N
Is the infiltration rate high? (y/n/u)	N
Is the site located in an area of karst terrain? (y/n)	N
Is the subsurface highly permeable or conductive? (y/n/u)	N
Is drinking water drawn from a shallow aquifer? (y/n/u)	N
Are suspected contaminants highly mobile in ground water? (y/n/u)	Y
Does analytical or circumstantial evidence suggest ground water contamination? (y/n/u)	Y

Other criteria? (y/n) N

SUSPECTED RELEASE? (y/n) Y

Summarize the rationale for Suspected Release:

Previous investigations have indicated total petroleum hydrocarbons, metals, and PCB contamination in the area of the former Building #10. Information from the Environmental Baseline Survey by Tetra Tech revealed that contamination at the site is much more widespread, including soil contamination within Building #3. Subsurface soils are expected to be contaminated throughout the former facility and presumably contributing to onsite groundwater contamination. A former ATCOM industrial hygienist (IH) indicated to START that an underground network of tunnels are situated under the SLAAP/SLOP facilities. These tunnels were used for various purposes and include transportation of equipment and supplies, and munitions. In addition, test firing munitions was also conducted along some tunnels. The IH also noted having observed standing groundwater (possibly perched groundwater) within SLAAP/SLOP tunnels. If the perched groundwater is contaminated a potential to release to the shallow aquifer may be occurring. The aquifer underlying the site is the Mississippian aquifer and the top of the water table is thought to be able 65 feet below ground surface.

Ref: 1,2,6,7,28

Ground Water Pathway Criteria List  
Primary Targets

Is any drinking water well nearby? (y/n/u)	N
Has any nearby drinking water well been closed? (y/n/u)	N
Has any nearby drinking water well user reported foul-testing or foul-smelling water? (y/n/u)	N
Does any nearby well have a large drawdown/high production rate? (y/n/u)	N
Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance? (y/n/u)	U
Does analytical or circumstantial evidence suggest contamination at a drinking water well? (y/n/u)	U
Does any drinking water well warrant sampling? (y/n/u)	U

Other criteria? (y/n) N

PRIMARY TARGET(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Targets:

No municipal wells are located within four miles of the SLAAP site. MDNR indicated that the closest private drinking water wells are located about three miles from the site. There are no known reports of drinking water contamination as a result of the SLAAP facility.

Ref: 2,3,6

## Pathway Characteristics

[illegible]

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0		
4. SECONDARY TARGET POPULATION Are any wells part of a blended system? (y/n) N	1	0	
5. NEAREST WELL	3	0	
6. WELLHEAD PROTECTION AREA None within 4 Miles	0	0	
7. RESOURCES	5	0	
T =	9	0	

## WC =

GROUND WATER PATHWAY SCORE:

1

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Ground Water Target Populations

Primary Target Population Drinking Water Well ID	Dist. (miles)	Population Served	Reference	Value
None				
*** Note : Maximum of 5 Wells Are Printed ***				Total

Secondary Target Population Distance Categories	Population Served	Reference	Value
0 to 1/4 mile	0		0
Greater than 1/4 to 1/2 mile	0		0
Greater than 1/2 to 1 mile	0		0
Greater than 1 to 2 miles	0		0
Greater than 2 to 3 miles	5		1
Greater than 3 to 4 miles	0		0
			Total
			1

Apportionment Documentation for a Blended System

MDNR-Division of Geology and Land Survey identified two wells which are located about 2.5 and 2.8 miles to the northeast and southwest of the SLAAP site. Wells are about 380 feet and 340 feet deep and serve a business and a residential property.

Ref: 2,6

Surface Water Pathway Criteria List  
Suspected Release

Is surface water nearby? (y/n/u)	N
Is waste quantity particularly large? (y/n/u)	U
Is the drainage area large? (y/n/u)	N
Is rainfall heavy? (y/n/u)	N
Is the infiltration rate low? (y/n/u)	N
Are sources poorly contained or prone to runoff or flooding? (y/n/u)	Y
Is a runoff route well defined(e.g.ditch/channel to surf.water)? (y/n/u)	N
Is vegetation stressed along the probable runoff path? (y/n/u)	U
Are sediments or water unnaturally discolored? (y/n/u)	U
Is wildlife unnaturally absent? (y/n/u)	U
Has deposition of waste into surface water been observed? (y/n/u)	N
Is ground water discharge to surface water likely? (y/n/u)	N
Does analytical/circumstantial evidence suggest S.W. contam? (y/n/u)	N
Other criteria? (y/n)	N

SUSPECTED RELEASE? (y/n) N

Summarize the rationale for Suspected Release:

There is no suspected release into a surface water body. The closest surface water of significance is the Mississippi River, located about 2.65 miles to the east of the site. Flooding is also not a concern at the facility, as it is thought to be located on a topographic high. The exposure threat to any potential targets along the Mississippi River would be low due to the distance to the nearby surface water (> 2 miles) and the high dilution factor of the river (>10,000 cfs). Surface drainage from the site is collected by catch basins that eventually discharge to the St. Louis combined sewer system.

Ref: 1,2,3,11,15

Surface Water Pathway Criteria List  
Primary Targets

Is any target nearby? (y/n/u)      If yes:      N  
    N Drinking water intake  
    N Fishery  
    N Sensitive environment

Has any intake, fishery, or recreational area been closed? (y/n/u)      N

Does analytical or circumstantial evidence suggest surface water  
    contamination at or downstream of a target? (y/n/u)      N

Does any target warrant sampling? (y/n/u)      If yes:      N  
    N Drinking water intake  
    N Fishery  
    N Sensitive environment

Other criteria? (y/n)      N

PRIMARY INTAKE(S) IDENTIFIED? (y/n)      N

Summarize the rationale for Primary Intakes:

No surface water intakes are located within 15 downstream miles from  
the site.

Ref: 2,11  
continued -----

continued '-----

Other criteria? (y/n) N

PRIMARY FISHERY(IES) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Fisheries:

There are no primary fisheries identified for this site. The nearest secondary fishery is the Mississippi River located greater than 2 miles from the site.

Ref: 2,4

Other criteria? (y/n) N

PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Sensitive Environments:

There are no primary sensitive environments for this site. Secondary sensitive environments include wetland areas located along the Mississippi River, which is located greater than 3 downstream miles from the site.

Ref: 2,5

### Pathway Characteristics

Pathway Characteristics			Ref..
Do you suspect a release? (y/n)	No		
Distance to surface water (feet):	13992		
Flood frequency (years):	>500		
What is the downstream distance (miles) to:			
a. the nearest drinking water intake?	N.A.		
b. the nearest fishery?	3.0		
c. the nearest sensitive environment?	3.0		
LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	0		
2. NO SUSPECTED RELEASE		100	
LR =	0	100	

Drinking Water Threat Targets

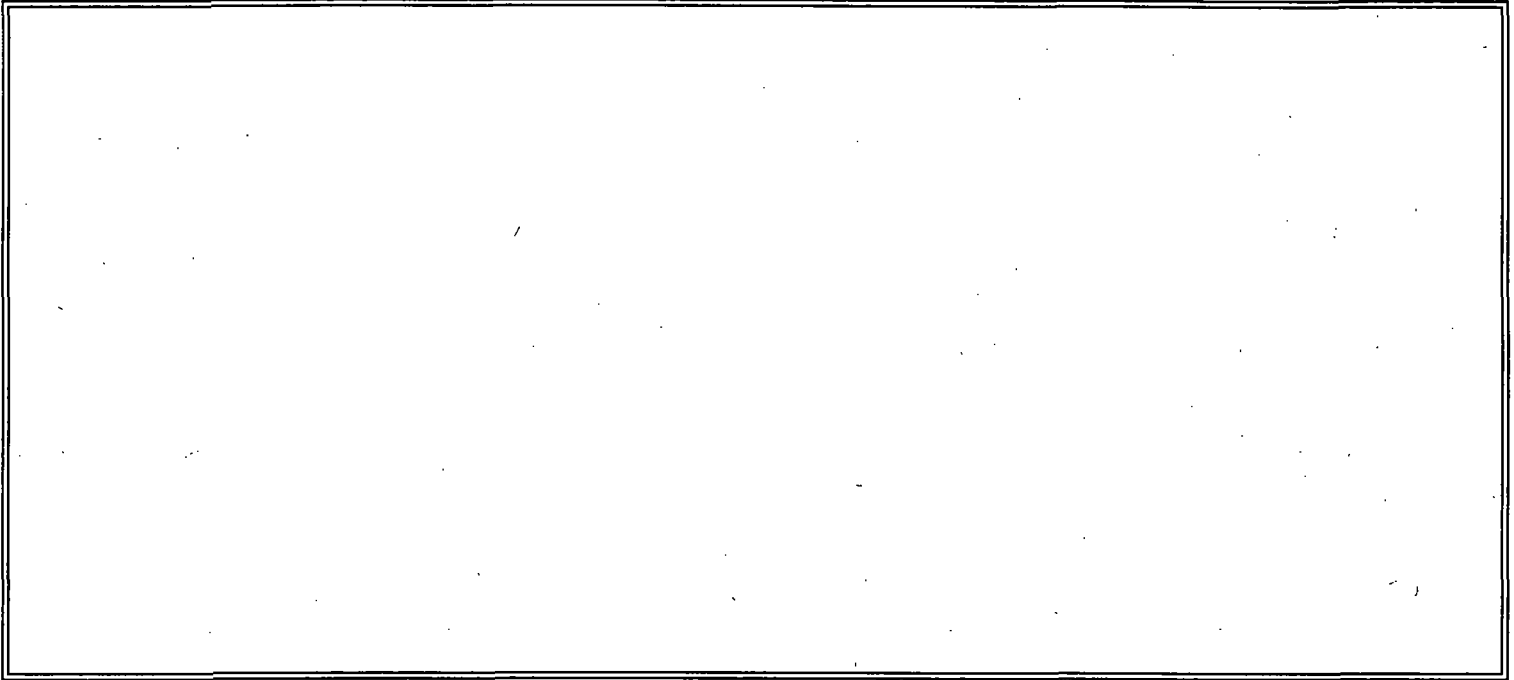
TARGETS	Suspected Release	No Suspected Release	References
3. Determine the water body type, flow (if applicable), and number of people served by each drinking water intake.			
4. PRIMARY TARGET POPULATION 0 person(s)	0		
5. SECONDARY TARGET POPULATION Are any intakes part of a blended system? (y/n): N	0	0	
6. NEAREST INTAKE	0	0	
7. RESOURCES	0	5	
T =	0	5	

Drinking Water Threat Target Populations

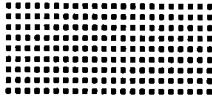
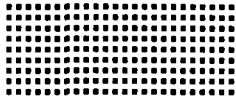
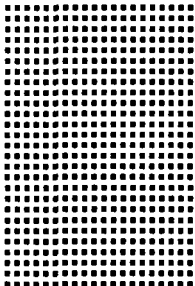

Intake Name	Primary (y/n)	Water Body Type/Flow	Population Served	Ref.	Value
1 None	N		0		0
Total Primary Target Population Value					0
Total Secondary Target Population Value					0

\*\*\* Note : Maximum of 6 Intakes Are Printed \*\*\*

Apportionment Documentation for a Blended System



Human Food Chain Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
8. Determine the water body type and flow for each fishery within the target limit.			
9. PRIMARY FISHERIES	0		
10. SECONDARY FISHERIES	0	12	
T =	0	12	

Human Food Chain Threat Targets

Fishery Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Mississippi River	N	>10000 cfs	2,4	12
Total Primary Fisheries Value				0
Total Secondary Fisheries Value				0

\*\*\* Note : Maximum of 6 Fisheries Are Printed \*\*\*

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**Environmental Threat Targets**

TARGETS	Suspected Release	No Suspected Release	References
11. Determine the water body type and flow (if applicable) for each sensitive environment.			
12. PRIMARY SENSITIVE ENVIRONMENTS	0		
13. SECONDARY SENSITIVE ENVIRONS.	0	10	
T =	0	10	

**Environmental Threat Targets**

Sensitive Environment Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Mississippi River	N	>10000 cfs	2,4,5	0
Total Primary Sensitive Environments Value				0
Total Secondary Sensitive Environments Value				0
*** Note: Maximum of 6 Sensitive Environments Are Printed ***				

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Surface Water Pathway Threat Scores

Threat	Likelihood of Release (LR) Score	Targets (T) Score	Pathway Waste Characteristics (WC) Score	Threat Score LR x T x WC / 82,500
Drinking Water	100	5	18	0
Human Food Chain	100	12	18	0
Environmental	100	10	18	0

SURFACE WATER PATHWAY SCORE:

1

Soil Exposure Pathway Criteria List  
Resident Population

Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination? (y/n/u)	U
Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator? (y/n/u)	N
Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities? (y/n/u)	Y
Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems? (y/n/u)	N
Does any neighboring property warrant sampling? (y/n/u)	Y
Other criteria? (y/n)	N

RESIDENT POPULATION IDENTIFIED? (y/n) Y

Summarize the rationale for Resident Population:

Since the full extent of contamination has not been totally identified at the SLAAP site it is difficult to assess if any residential targets are situated within 200 feet of a contaminated source. Some previous investigations have indicated surface and subsurface soil contamination and the Tetra Tech survey has also indicated the likelihood of a more widespread contamination problem at the site. At the time of SLAAP's construction, the properties directly to west and northwest were entirely residential. Currently, there is some commercial developments present in these areas. Additional sampling is necessary to identify source areas at the site and to adequately assess the resident population threat. According to the US Topographic map a school is also located about 500 feet southwest of the site. It should be noted that during the site visit conducted by Tetra Tech, no visible signs of surface soil contamination were identified. The majority of the facility is asphalt and concrete covered with about a total of 3 acres of grassy/soil areas. Currently, the site is inactive and there are no workers on site.

Ref: 2,9,13,28

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SOIL EXPOSURE PATHWAY SCORESHEETS

Pathway Characteristics

	Ref.
Do any people live on or within 200 ft of areas of suspected contamination? (y/n) Yes	2,12
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination? (y/n) Yes	2
Is the facility active? (y/n): No	1

LIKELIHOOD OF EXPOSURE	Suspected Contamination	References
1. SUSPECTED CONTAMINATION LE =	550	.....

Targets

2. RESIDENT POPULATION 0 resident(s) 0 school/daycare student(s)	0	.....
3. RESIDENT INDIVIDUAL	0	.....
4. WORKERS None	0	.....
5. TERRES. SENSITIVE ENVIRONMENTS	0	.....
6. RESOURCES	0	.....
T =	0	.....

WASTE CHARACTERISTICS

WC =

18

RESIDENT POPULATION THREAT SCORE:

1

NEARBY POPULATION THREAT SCORE:

2

Population Within 1 Mile: 10,001 - 50,000

SOIL EXPOSURE PATHWAY SCORE:

3

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Soil Exposure Pathway Terrestrial Sensitive Environments

Terrestrial Sensitive Environment Name	Reference	Value
None		
Total Terrestrial Sensitive Environments Value		
*** Note : Maximum of 7 Sensitive Environments Are Printed ***		

Air Pathway Criteria List  
Suspected Release

Are odors currently reported? (y/n/u)	N
Has release of a hazardous substance to the air been directly observed? (y/n/u)	N
Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air? (y/n/u)	U
Does analytical/circumstantial evidence suggest release to air? (y/n/u)	U
Other criteria? (y/n)	N

SUSPECTED RELEASE? (y/n) N

Summarize the rationale for Suspected Release:

During the site's past operational history, there were most likely air emissions as a result from operations: furnaces used for forge operations were located in Building #2. Information pertaining to the facility's air emissions or any adverse health effects is not available. The site is currently inactive and a suspected release is not suspected. A concern for future tenants/workers at the site does exist however, due to the contaminated buildings and tunnels currently remaining onsite.

Ref: 1,28

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AIR PATHWAY SCORESHEETS

Pathway Characteristics

Pathway Characteristics			Ref.
Do you suspect a release? (y/n)		No	.....
Distance to the nearest individual (feet):		250	2,28
LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	0	.....	.....
2. NO SUSPECTED RELEASE	.....	500	
LR =	0	500	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0	.....	.....
4. SECONDARY TARGET POPULATION	0	157	
5. NEAREST INDIVIDUAL	0	20	
6. PRIMARY SENSITIVE ENVIRONS.	0	.....	
7. SECONDARY SENSITIVE ENVIRONS.	0	0	
8. RESOURCES	0	5	
T =	0	182	

WASTE CHARACTERISTICS

WC =

0	18
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AIR PATHWAY SCORE:

20
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Air Pathway Secondary Target Populations

Distance Categories	Population	References	Value
Onsite	0		0
Greater than 0 to 1/4 mile	1607		41
Greater than 1/4 to 1/2 mile	4337		28
Greater than 1/2 to 1 mile	17928		26
Greater than 1 to 2 miles	56371		27
Greater than 2 to 3 miles	76785		12
Greater than 3 to 4 miles	107207		23
Total Secondary Population Value			157

Air Pathway Primary Sensitive Environments

Sensitive Environment Name	Reference	Value
None		
Total Primary Sensitive Environments Value		

\*\*\* Note : Maximum of 7 Sensitive Environments Are Printed\*\*\*

Air Pathway Secondary Sensitive Environments

Sensitive Environment Name	Distance	Reference	Value
None			
Total Secondary Sensitive Environments Value			

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SITE SCORE CALCULATION	SCORE
GROUND WATER PATHWAY SCORE:	1
SURFACE WATER PATHWAY SCORE:	1
SOIL EXPOSURE PATHWAY SCORE:	3
AIR PATHWAY SCORE:	20
SITE SCORE:	10

SUMMARY

1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water? No

If yes, identify the well(s).

If yes, how many people are served by the threatened well(s)? 0

2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?

- |  |    |
|--|----|
| A. Drinking water intake                                     | No |
| B. Fishery   | No |
| C. Sensitive environment (wetland, critical habitat, others) | No |

If yes, identify the target(s).

3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility? No

If yes, identify the properties and estimate the associated population(s)

4. Are there public health concerns at this site that are not addressed by PA scoring considerations? Yes

If yes, explain:

Public health concerns do appear to exist at the SLAAP site due to contaminated buildings and tunnels remaining onsite.

REFERENCE LIST

1. Tetra Tech EM Inc.. 1999 Draft Phase I Environmental Baseline Survey Report, St. Louis Army Ammunition Plant, St. Louis, MO. Prepared for U.S. Army Aviation and Missile Command, Redstone Arsenal, Alabama
2. United States Geological Survey (USGS), 1984(b). 7.5 -Minute Series Topographic Map of the Clayton, Missouri Quadrangle.
3. Environmental Science and Engineering, 1987. Update of the Initial Installation Assessment of St. Louis Army Ammunition Plant. July
4. Robinson, John. December 14, 1998. Fisheries Research Biologist for Mo Dept. of Conservation. Subject: Commercial fishery harvest in vicinity of site.
5. U.S. Department of the Interior. 1993. Fish and Wildlife Service. National Wetland Inventory Map. Washington, D.C.
6. Missouri Department of Natural Resources, Division of Geology and Land Survey, Registered wells/logs within a 4-mile radius of the SLAAP site
7. Kraeger, Bob, April 8, 1999. Environmental Specialist for MoDNR Subject: PCB/TSCA Notice of Noncompliance with SLAAP, Jan. 1991.
8. Phillippi, Dave, April 7, 1999. Toxics Substances Control Section/ Toxics and Pesticides Branch, USEPA. Subject: PCB/TSCA Notice of Non compliance with SLAAP, Jan. 1991.
9. Geller, Bob, April, 1999. MoDNR Federal Facilities Section Chief. Subject: St. Louis Army Ammunition Plant/ St. Louis Ordnance Plant.
10. Geographic Exposure Modeling, (GEMS), 1997
11. Bell, Charlie, September, 1998, Illinois EPA Public Water Supply. Personnel communication with Martha Kopper (Ecology & Environment, Inc)
12. U.S. Department of Commerce. 1990. 1990 Census of Population and Housing, County of St. Louis.
13. Kerns, Don, 1999. MoDNR DOD Unit Chief Subject: St. Louis Army Ammunition Plant/St. Louis Ordnance Works.
14. U.S. Army Toxic and Hazardous Materials Agency (USATHMA). 1979. Installation Assessment of St. Louis Army Ammunition Plant. Report No. 153. December.
15. USCOE, 1989. Investigation and Evaluation of Underground Storage Tanks St. Louis AAP, St. Louis, Missouri, September.
16. Missouri Department of Natural Resources, 1995. Letter to US ATCOM regarding SLAAP site inspection.

17. Woodward-Clyde-consultants. 1996. Health Based Risk Assessment, Building No. 3, Army Ammunition Plant, St. Louis, Missouri, June.
18. Missouri Department of Natural Resources, 1994. Letter to US ATCOM regarding eligibility for inclusion in the National Register of Historic Places.
19. Missouri Department of Conservation, 1993. Letter to US ATCOM regarding impacted natural resources at SLAAP.
20. United States Environmental Protection Agency, 1993. Letter to US ATCOM regarding remediation of PCB contamination in Building #3.
21. United States Environmental Protection Agency, 1991. Notice of Noncompliance TSCA Docket Number VII-91-T-304 to US AVSCOM for PCB contamination in Building #3.
22. US AVCOM, 1990. Letter to Bob Jackson, USEPA regarding PCB contamination and remediation and removal of creosote wood.
23. Missouri Department of Natural Resources, Environmental Laboratory Services, 1991. Analytical results of swipe samples from Building #3. January.
24. St. Louis Ordnance Plant, United States Cartridge Company, McQuay-Norris Manufacturing Co. Circa 1941. Bullets by the Billions.
25. Dames and Moore, 1994. Remediation Design and Development Report for Plant Facilities Engineering, Inc. Job No. 06702-113-209.
26. U.S. Army Environmental Hygiene Agency, 1993. Preliminary Assessment Screening No. 38-26-K19X-93, St. Louis Army Ammunition Plant.
27. Conwell, Dennis, 1966. Memo to Richard Barttelbort regarding sewer discharge from SLAAP to MSD system. October.
28. Atchison, Tammy, 1999. Former industrial hygienist at ATCOM. Personal communication. Subject: Condition of underlying tunnels at SLAAP/SLOP.

## **ATTACHMENT 3**

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### **HRS Scoring Deficiency Checklist**

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

Date Reviewed: April 20, 1999

EPA ID#: MO42100221222

Reviewed By: Ecology & Environment, Inc.

Facility Name: 4800 Goodfellow Blvd

City/State: St. Louis, Missouri

INFORMATION IS...(Check Box if YES)

	Provided	Acceptable	Not Provided	Estimated by START
<b>1. OVERVIEW/SITE HISTORY</b>				
1A. Report submitted to EPA are referenced and copies of each reference are provided.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1B. Describe facility operations (manufacturing, storage, waste disposal practices, etc.) Including the following:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1B1. History of the facility and sources (any area containing or potentially containing hazardous substances).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1B2. A topographic map with a 4-mile radius drawn around each site.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1B3. A facility and source location map and sketch.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1B4. Regulatory history of the facility (e.g., RCRA facility, TSCA, CERCLA, NPDES permits, etc.).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1C. Describe any emergency response actions or interim remedial actions that have occurred at the facility. Description should include amount of material removed, disposal location, and sample analytical results prior and subsequent to removal.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1D. Describe any release of hazardous substances, pollutants, or contaminants to groundwater, surface water, soil or air and provide sampling with detection limits, laboratory methods, and quality assurance procedures.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1E. Give the following population within each radius indicated below. Each radius should begin at the center of each source if the source is small or at the outer edge if the source is large. Count population in overlapping areas only once.				
1E1. 0—¼ mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1E2. ¼—½ mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1E3. ½—1 mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1E4. 1—2 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1E5. 2—3 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1E6. 3—4 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1F. Describe any prior spills (e.g., quantity of the spill, hazardous substances) that occurred at the facility.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1G. Describe facility and source security and access (e.g., fences, patrol gates, natural barriers, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>2. WASTE/SOURCE INFORMATION</b> (see Section 2 of the <b>HRS Final Rule, Federal Register</b> , December 1990).				
2A. Describe as specifically as possible the types of wastes produced at the facility and the methods in which these wastes were treated, stored, or disposed of (including location of disposal).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2B. Describe as specifically as possible the amount (volume, weight, etc.) of each waste type produced and the form in which it was discharged or disposed (e.g., solid, liquid, gas, etc.) at the facility.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2C. Describe each source type (e.g., landfill, surface impoundment, etc.) located within the facility boundary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

INFORMATION IS...(Check Box if YES)

	Provided	Acceptable	Not Provided	Estimated by START
<b>2D.</b> Describe as specifically as possible the constituents (concentrations of individual constituents) of each waste type disposed in each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>2E.</b> Describe as specifically as possible the amount of waste treated, stored, or disposed of in each source (e.g., landfills, impoundments, tanks).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>2F.</b> Determine the depth at which wastes were deposited in each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>2G.</b> Describe as specifically as possible the condition/integrity of each source (e.g., do landfills have liners or caps?).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>2H.</b> Describe any secondary containment features/structures associated with each source (e.g., precipitation run-on and runoff systems, leachate collection systems, gas collection systems, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>2I.</b> Determine the size, volume, capacity, and area of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3.0 GROUNDWATER PATHWAY INFORMATION</b> (see Section 3 of the HRS Final Rule, <i>Federal Register</i> , December 1990.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3A.</b> Determine if the groundwater within a 4-mile radius of each source is used for any of the following purposes and locate the wells on a map. Each radius should begin at the center of each source if the source is small or at the outer edge if it is large. Provide the depth of each well.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3A1.</b> Private or Public Drinking Water Source	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3A2.</b> Irrigation of commercial food or commercial forage crops (include acres).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3A3.</b> Commercial livestock watering.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3A4.</b> Commercial aquaculture.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3A5.</b> Water for major or designated recreational area, excluding drinking-water use.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3A6.</b> Standby wells used for drinking water at least once a year.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3B.</b> Outline the public water distribution system within a 4-mile radius of each source on a topographic map.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3C.</b> Identify the nearest drinking water well within a 4-mile radius of each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3D.</b> Determine the population (including workers, students, and residents) drawing from each drinking-water well within the following radii. Each radius should start at the center of each source if the source is small, or at the outer edge if it is large. Count overlapping population only once.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3D1.</b> 0—¼ mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3D2.</b> ¼—½ mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3D3.</b> ½—1 mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3D4.</b> 1—2 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3D5.</b> 2—3 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3D6.</b> 3—4 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3E.</b> Describe known or probable groundwater flow direction from each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3F.</b> Describe as specifically as possible the geology and hydrogeology of the facility area (including geological formation names, thickness, types of material, hydraulic conductivities, and depth to aquifers); provide references.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

	INFORMATION IS...(Check Box if YES)			
	Provided	Acceptable	Not Provided	Estimated by START
3G. Discuss any evidence of aquitards and discontinuities between aquifers within a 4-mile radius of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3H. Describe any evidence of interconnections between the uppermost aquifer and the lower aquifer within 2 miles of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3I. Estimate annual net precipitation at the facility.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3J. Discuss soil or geologic conditions that might inhibit or facilitate groundwater migration.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3K. Determine if sources are located in an area of Karst terrain.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3L. Provide results from groundwater sampling of aquifers underlying the sources and from domestic wells (drinking water) within 2 miles of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3M. Provide results from background groundwater sampling of aquifers underlying the sources.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3N. Determine if any areas within a 4-mile radius of each source are located in a Wellhead Protection Area according to Section 1428 of the Safe Drinking Water Act.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>4.0 SURFACE WATER PATHWAY INFORMATION</b> (see Section 4 of the HRS Final Rule, <i>Federal Register</i> , December 1990.)				
4A. Describe surface water bodies 0 to 15 miles downstream of each source and provide a map of surface water bodies receiving drainage from each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4B. Discuss the probable surface runoff pattern from each source to surface waters, including the distance to the nearest surface water body; provide a map.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4C. Describe the point(s) at each source where hazardous substances begin to migrate and their probable point(s) of entry into a surface water body (including ponds, lakes, streams, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D. Identify if surface water drawn from intakes within 15 miles downstream of the probable point of entry is used for any of the following purposes:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D1. Irrigation (5-acre minimum) of commercial food or commercial forage crops.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D2. Watering of commercial livestock.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D3. Ingredient in commercial food preparation.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D4. Major of designated water recreation area, excluding drinking water.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E. Identify the following targets associated with surface water bodies 0 to 15 miles downstream of the probable point of entry:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E1. Population (residents, workers, and students) served by surface water intakes of drinking water.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E2. Sensitive environments (see Table 4-23, of the HRS Final Rule, <i>Federal Register</i> , December 1990) and critical habits for federally endangered or threatened species.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E3. Economically important resources (e.g., shellfish).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E4. Any portion of the surface water designated by a state for drinking water use under Section 305(a) of the Clean Water Act; or any portion of surface water usable for drinking water.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4F. Determine the miles of wetland (wetland frontage) along surface water bodies 0 to 15 miles downstream from the probable point of entry (see 40 CFR section 230.3).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4G. Provide results from sampling of wetlands and/or sensitive environments 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

INFORMATION IS...(Check Box if YES)

	Provided	Acceptable	Not Provided	Estimated by START
4H. Discuss any qualitative, quantitative, or circumstantial evidence of contamination of surface waters from source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4I. Provide results from sediment and surface water sampling for points 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4J. Provide results from background sediment and surface water sampling.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4K. Provide results from sampling of surface water intakes 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4L. Estimate the size of the upgradient drainage area for each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4M. Determine the 2-year, 24-hour rainfall for the site.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4N. Discuss the average annual streamflow associated with each surface water body located 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4O. Determine surface soil types at the facility.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4P. Determine if sources are located in a 1-year, 10-year, 100-year, or 500-year flood plain.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4Q. Discuss fisheries (recreational or commercial) in surface water bodies 0 to 15 miles downstream of each source:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4Q1. Describe annual production (in pounds) of human food chain organisms (e.g., trout, shellfish, snapping turtles, crabs) per acre of streams and rivers 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4Q2. Describe annual production (in pounds) of human food chain organisms (e.g., trout, shellfish, snapping turtles, crabs) per acre of ponds, lakes, bays, or oceans 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4R. Identify closed fisheries 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4S. Provide results from sampling of human food chain organism tissues in streams and rivers 0 to 15 miles downstream of each source and in ponds, lakes, and bays that receive drainage from the sources.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>5.0 AIR PATHWAY INFORMATION</b> (see Section 4 of the HRS Final Rule, <i>Federal Register</i> , December 1990.)				
5A. Describe if there has been an observed release (i.e., visual or analytical evidence) of a hazardous substance to the atmosphere.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5B. Determine the shortest distance to the closest residence or regularly occupied building or area from any on-site source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5C. Determine if any of the following resources are located within a 1/2-mile radius of each source:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5C1. Commercial agriculture.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5C2. Commercial silviculture.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5C3. Major or designated recreation area.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5D. Determine if sensitive environments are within 4-mile radius of each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5E. Determine the total area of wetlands within a 4-mile radius of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

INFORMATION IS...(Check Box if YES)

**6.0 SOIL EXPOSURE PATHWAY INFORMATION** (see Section 5 of the HRS Final Rule, *Federal Register*, December 1990.)

☐ Provided    ☐ Acceptable    ☒ Not Provided    ☒ Estimated by START

- 6A.** Describe any areas of contamination that are within 2 feet of the ground surface; provide the areal extent of contamination. ☐ ☐ ☒ ☒
- 6B.** Provide locations and depths of soil samples and results. ☐ ☐ ☒ ☒
- 6C.** Provide results of background soil sampling. ☐ ☐ ☒ ☐
- 6D.** Identify locations of the closest residence, school, or daycare within 200 feet of each source; provide population of each. ☐ ☐ ☒ ☒

**\*Additional Comments:**

- 1A.- An EBS report was provided and highlighted areas of concerns (mainly areas within buildings) with attachments concerning the site survey/history, etc. Actual references used were not available. The report was however, very informative.
- 1B1.-The EBS report was infomative concerning the SLAAP facility history and each bulding operation processes; however, data gaps remain concerning operations and type of wastes after the munition plant. Unclear of waste handling practices/sources in the 1970s, 80s, etc. Also limited information in file and report regarding wastes other than PCBs in Building #3. The EBS report mainly highlighted areas of concern within each building on the property.
- 1B4.- Limited information on regulatory history. Information submitted included Notice of Noncompliance from EPA regarding TSCA regulations for Building #3. Discussions with MoDNR yielded pertinent information obtained by START research.
- 1C.- SLAAP provided limited interim remedial actions information regarding the yet unresolved cleanup of PCBs from Building #3. START obtained additional information from MoDNR and EPA regarding remedial actions issues. Limited information was available concernign amounts of materials removed and analytical results. There was no file information concerning analtical samples collected after subsequent removals.
- 1D.-Some sampling, detection limits, laboratory methods, quality assurrance procedures were provided for the 1991 sampling of PCBs in Building #3. No ground water, surface water, or air sampling was conducted at the site. Limited soil sampling conducted outside of the buildings.
- 1E.-SLAAP did not provide population information. START estimated the population using GEMS software program.
- 1F.-Limited documents discussed PCB contamination in Building #3 and possible oil leaks in Building #2. No reports of any spills. The EBS report highlighted areas of concern identified during a site tour of the facility.
- 2A.- SLAAP provided general information on the types of waste, little to no information on treatment, storage, and disposal of waste. Specific information prior to RCRA enactment was not included. Information concerning waste handling operations after the munition plant closed was also not provided.
- 2B- SLAAP did not provide information on the amount of wastes and the forms in which it was disposed. START obtained some of this information from MoDNR. It is unknown if all waste types and disposal areas have been identified.
- 2C.-SLAAP indicated possible area of concerns (mainly within buildings) in their EBS report. START has inferred source types and locations based on the operational history of the site.
- 2D.-SLAAP included generic discussions of constituents (ie:gasoline, heating oil) rather than specific chemicals (with the exception of sampling Building #3 which indicated PCB contamination and VOC contamination at Building #10).
- 2E.-SLAAP did not describe the amount of waste treated, stored, or disposed of. Information prior to RCRA enactment was not included.
- 2F.-SLAAP did not indicate the approximate depth of excavations for the removal of the Underground Storage Tanks. No other reports on depths were included in the files.
- 2I.-SLAAP through supplied documents, provided the volume of the UST contaminated soil removal. The size, capacity and areas of all other potential sources

were not identified. START estimated some source areas for PA scoring purposes.

- 3A1.- SLAAP indicated that the closest private drinking water wells were about 3 miles from the site, but did not note owner or depth. START research determined that two private drinking water wells are located within the three mile radius.
- 3C.- SLAAP indicated closest private water wells were beyond 3 mile radius. START research determined two private water wells are located within the three mile radius.
- 3D.-No population was determined by SLAAP for the water wells. START estimated population drawing from each water well based on 1990 Census data.
- 3E.-SLAAP provided a general description of the groundwater flow direction from the site.
- 3F -The EBS did indicate some geological information; however hydraulic conductivities and depths to aquifers was not provided. Reference concerning geology and hydrogeology was not provided.
- 4A.-SLAAP did not provide a map of the site which included surface water bodies downstream from the source(s) and did not show the relationship of the site to surface water bodies receiving drainage. START inferred this information for PA Score purposes.
- 4B.-SLAAP did not include a map or describe the probable surface water runoff pattern from each potential source to surface waters.
- 4E.-The only target information provided was the identification of two wetland areas near the site. These wetland areas are not contiguous to a surface water body. Surface water sampling was not conducted and there was no information concerning surface water intakes sensitive environments, or fishery areas along the Mississippi River. It should be noted that the closest surface water body (Mississippi River) is located greater than 2 miles away.
- 5A - No information was provided regarding air releases to the atmosphere.
- 5D -Some wetland information was provided, but are located greater than 1 mile from the site.
- 6A.- SLAAP approximately described, through UST remediation documents, contamination within 2 feet of the ground surface. Areal extent was not included in any discussion. START inferred this information in the PA Score.
- 6B.-The EBS report noted potentially contaminated areas (mainly within buildings). Depths of UST confirmatory soil samples and results were not available.
- 6C.- No background soil samples were taken.
- 6D.- File information and the EBS report did not indicated closes residence or school within the vicinity of the site. START estimated approximate distances.

\* NOTE: Where information is provided but not acceptable, discuss briefly, why the information is not acceptable.

# PUBLICATION TRACKING FORM

(To Be Completed By Project Manager/Author)

PROJECT TITLE/SITE NAME: Roberts/Kopper

PROJECT MANAGER/AUTHOR: SLAAP

PROJECT DIRECTOR/STARTL: Overfelt

TECHNICAL EDITOR: Haden

PEER REVIEWER: \_\_\_\_\_

GRAPHICS: Barron

JOB NO.: K57104

TDD NO.: 507-9902-008

PAN NO.: 1165 SLT GTF

NATURE OF DOCUMENT: Final Memo

WORD PROCESSOR: L. Schumayer

DUE DATE: 7-30-99

STEP	LIST ALL REVIEWERS/WORD PROCESSORS IN PREFERRED SEQUENCE	DATE SUBMITTED	DATE REQUIRED	REVIEWED BY/TYPED BY	
				INITIALS	DATE
1	L. Schumayer	7-27-99		JKS	7/28/99
2	P. Roberts			PSR	7/28/99
3					
4					
5					
6					
7					
8					
9					
10					

## PREFERRED FINAL APPROVAL STEPS

11	Project Director/STARTL Approval			PSR	7/28/99
12	Word Processor/Finalize/Format/Put on Letterhead			PSR	7/28/99
13	Project Director/STARTL Sign-off (Gives to support staff to make copies)			RCO	7-29-99
14	Word Processor Sign-off (Copies and Sends Out)			JKS	7-29-99

### PRIORITY LEVEL:

Please circle appropriate number and initial in the space provided.

1+	(1)	2	3
	PSR		

### SPECIAL INSTRUCTIONS:

AOC Description Attached?

STARTL/ASTARTL Initials (Draft AOC)?

Spell Check? Dates? JKS 7/28/99

Copies Made? Number?

Other Instructions:

DATE FILED: 8-13-99

FINAL FORMAT

SEND TO DIANA BAILEY  
Also 5 copies of maps go to her



# ecology and environment, inc.

International Specialists in the Environment

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## MEMORANDUM

TO: Paul Doherty, EPA/START PO

FROM: Martha Kopper, E & E/STM

Patty S. Roberts, E & E/STM *PSR*

THRU: Robert C. Overfelt, CPG, E & E/START PM *RCO*

DATE: July 29, 1999

SUBJECT: Final Federal Facility Preliminary Assessment Review for St. Louis Army Ammunition Plant at 4800 Goodfellow Boulevard, St. Louis, Missouri.

CERCLIS ID: MO4210021222

TDD: S07-9902-008

PAN: 1165SLTGFF

EPA/FFSE: Diana Bailey

## INTRODUCTION

The Ecology and Environment, Inc. (E & E), Superfund Technical Assessment and Response Team (START) was tasked by the U. S. Environmental Protection Agency (EPA) Region 7 Federal Facility Special Emphasis (FFSE) program to conduct a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment (PA) review of the St. Louis Army Ammunition Plant (a.k.a., SLAAP, formerly part of the St. Louis Ordnance Plant) located at 4800 Goodfellow Boulevard, in St. Louis, Missouri.

The specific elements of this task included a file review, assessing the sources and pathways of any contaminants for the entire site, listing data gaps and completing a PA score for the SLAAP facility. These tasks were achieved through a review of available file information, interviewing State representatives knowledgeable of the site, and completion of the PA scoring worksheets and Hazard Ranking System (HRS) scoring deficiency checklist. Available file information included a draft Environmental Baseline

Survey (EBS) report completed by Tetra Tech EM Inc. (Tetra Tech), for the U.S. Army Aviation and Missile Command in Huntsville, Alabama. Available file information did not contain a CERCLA PA or a Site Inspection (SI) report for review. Limited Missouri Department of Natural Resources (MDNR) documents were also obtained and provided some additional information concerning the SLAAP and the St. Louis Ordnance Plant (SLOP) operations. The only sampling information consisted of investigations concerning the remediation of the interior basement of Building #3 (contaminated with polychlorinated biphenyls [PCBs]) and the removal and remediation of underground storage tanks (USTs) located east of Building #3. Due to the limited information and sampling conducted for the site, the most conservative approach was evaluated for PA scoring. Attachments 2 and 3 include the PA scoresheets and HRS scoring deficiency checklist.

## **SITE DESCRIPTION/LOCATION**

The SLAAP facility is located at 4800 Goodfellow Boulevard, in the city of St. Louis, Missouri. The geographic coordinates are latitude 38°40'1.53" N, and longitude 90°15'9.8" W.

The SLAAP facility is situated on Goodfellow Boulevard, south of I-70, and west of Riverview Boulevard in an industrial area (Attachment 1: Figure 1, Site Location Map). Goodfellow Boulevard runs north to south, and I-70 runs east to west in relationship to the site. To the south of the site are a number of warehouses, which at one time were part of the SLOP facility. One of the warehouses, owned by PURO Chemical Division, presently stores unknown bulk chemicals. Residential properties and commercial shops, (previously a part of the SLOP operations) are located approximately 250 feet to the west of SLAAP. A school, formerly on property operated by SLOP, is located about 500 feet southwest of the SLAAP property. The site is totally enclosed by a fence and two gated entrance ways.

The SLAAP facility is currently inactive. This approximately 21-acre complex consisted of 11 buildings (Attachment 1: Figure 2, Site Map). Presently, the property has eight unoccupied buildings that were used to house the main operating processes of the SLAAP facility. Buildings/structures removed from the facility include #7A (cooling tower), #8 and #8A (fuel oil storage area and oil pump house), #9 and #9A (acetylene generator and calcium carbide storage buildings), #9B (sludge pits), as well as buildings #9C and #9D (AST diox oxygen receiver and diox oxygen convertor). Two underground storage tanks (USTs), one located east of the Machining Building (#3), and the other located southwest of the Forge Building (#2) have also been removed. In addition, three quench oil tanks and a sludge pit have been removed from Building #10 and two former billet storage yards adjacent to Building #1 are now

paved parking lots. For the locations of the former and current buildings/structures, see Attachment 1, Figure 2.

Drainage from the operating facility was via sanitary/storm sewer drains that entered the Metropolitan Sewer District (MSD) system, which in turn flowed into the Mississippi River. It has been reported that a number of the buildings contained subfloor drains, pits, and piping, which eventually discharged into the MSD system. The site is nearly level, but is located near a topographic high point. Water flows to the north with lesser gradients to the east, west, and south. Rainwater that falls on the property eventually discharges to the St. Louis combined sewer system. No surface water is present on the SLAAP site. The closest body of water is the Mississippi River, which is about 2.65 miles east of the SLAAP property.

## **OPERATIONAL HISTORY AND WASTE TYPES**

The following information was obtained from available MDNR and EPA files and the draft EBS report. It comprises past and present operational history and waste types. Some waste treatment, storage, and disposal practices conducted at the former SLAAP facility are still unknown at this time.

General Electric Company/General Electric Realty Corporation owned the site property from January 1926 to April 1941. Subsequent to this date, the property was purchased by the federal government for construction of the St. Louis Ordnance Plant (operated by Chevrolet Motor Division as needed from 1945 until 1972). The SLAAP facility, composed of about 21 acres in the northern portion of SLOP, was purchased in 1941 (the same year SLOP began its operations). The St. Louis Ordnance Plant covered 276 acres, which included land to the west and south of the present SLAAP location. The mission of SLAAP initially was to manufacture 0.30-millimeter (mm) and 0.50-mm caliber munitions (from 1941 to 1944). From 1944 until 1969, SLAAP production consisted of 105-mm howitzer shells (from 1944 to 1945) for World War II needs. The buildings constructed for the initial small arms production included Buildings #3, #5, #6 and #9. Buildings added for the 105-mm howitzer shell production included #1, #2, #4, and #7 through #11 (except for #9). After World War II, SLAAP was placed on standby status. During the reactivation from 1951 to 1954 and from 1966 to 1969 the plant was again used to manufacture 105-mm howitzer shells for the Korean and Vietnam Wars. Subsequent to 1969, the SLAAP facility operations were placed on hold. In 1984, buildings at SLAAP were renovated for use by the U.S. Army Aviation Systems Command (AVSCOM). In 1985, portions of Buildings #3, #5 and #6 were converted into offices. In 1989, the Department of the Army determined that SLAAP was not needed to support its munitions program, and had the production equipment removed. From 1986 to 1990, SLAAP was under the

command of the U.S. Armament, Munitions and Chemical Command (AMCCOM). In 1990, plant ownership and control were placed under U.S. Army Aviation and Troop Command (ATCOM). As of 1972, plant maintenance and surveillance activities were subcontracted by Donovan Construction Company to Plant Facilities and Engineering (PFE), Inc. The facility is currently vacant and under the control of AMCCOM.

The draft EBS report generally discussed the physical settings and processes of the former SLAAP facility. The report also provided the current physical conditions of each unoccupied building and the site property which was observed during a site tour. Details regarding the processes which took place within each building during the various temporal periods, including the production of the 0.30-mm and 0.50-mm caliber small arms munitions between 1941 and 1944, were not incorporated into the report. As a result, certain materials and processes used, wastes generated, and locations of these processes are unknown for the SLAAP facility.

Other information obtained from MDNR was used to partially fill in these data gaps, particularly the production of the 0.30-mm caliber munitions between 1941 and 1944. The available information indicated that the SLAAP/SLOP facility during this time period produced 0.30-mm caliber munitions, tracer, armor piercing, and ball bullets. In general, cartridges were made up of three metallic components: the brass case (composed of 70% copper and 30% zinc), which held the explosive powder, the primer (composed of brass), which held the high explosive charge, and the bullet (composed of a brass jacket with a lead/steel core). Once the brass cartridge cases were thoroughly shaped and had gone through annealing heat application and pickling acid bath treatment processes, the primer insertion machine pierced flash holes at the head of the case, into which primers (small cap/tube containing an explosive) were loaded. Bullet jackets received slugs, which were inserted into the lead/steel cores (except for tracer bullets, which contained a core of chemical compounds, including phosphorus). Smokeless powder was added into the body of the cartridge for all small-arms caliber munitions for the final process. Lead was used for tracer bullet cores, inner tips of armor-piercing bullets and cores for ball bullets. A reported "Lead Shop" (exact location unknown) received the lead in 90-pound solid cylinders. Lead billets were then placed into a 40-ton extrusion press, which pressed the lead through dies, forming it into wire. The wire then went to the swaging machine where it was cut into lengths, fed into dies, and then formed into slugs. The available information did not indicate whether forging/heating of the molten slugs had occurred, but did indicate that quench and spray operations did occur within for the production of small arms munitions. The buildings utilized for this initial small arms production included buildings #3 (machining operations), #5 and #6 (primer loading/insertion operations), and #9 (smokeless powder canning operations). Contaminants and

wastestreams generated from the manufacturing of the initial small arms munitions probably included explosives (primer and tracer compounds), nitrates, and perchlorates, VOCs, and SVOCs (solvents, paints, and oils), emulsifiers, abrasives, and alkaline agents and acids. Other contaminants and wastes that may have been generated from the shell machining and primer loading processes would include metals, particularly lead, copper, and zinc, and PCBs from the use of cutting/soluble oils, quench oils and transformer oils. VOC contaminants from air emissions from painting/solvents and acid/metallic mists may also be present. Information concerning the 0.50-mm caliber munitions, including historical manufacturing processes and the locations of these processes, was not available.

The following information includes a brief description of each building formerly/currently located on the SLAAP property. Information, as stated earlier, is from the draft EBS report and other MDNR file information and interviews. A brief description of the historical manufacturing processes is also discussed for each building, as well as possible materials used and contaminants/wastes generated from the former processes. See Figure 2 for the location of the former and current building/structure.

The billet-cutting Building #1, during the 105-mm shells production, housed several processes, one of which consisted of utilization of acetylene gas torches to nick and break steel rods/billets into measured lengths. Hydraulic systems were employed in the break operation. The steel rods/billets were stored in storage yards located on either side of Building #1 (currently parking lots) before being transferred to Building #2 (Forge Building). The draft EBS report indicated that spray and quench operations using quenching fluids (composed of acids and solvents) and water were also conducted in this building. Some materials used during the billet-cutting processes include solvents, acids, quench water, cooling and hydraulic oils, and machine lubricants. Contaminants associated with the above-mentioned processes include VOCs, SVOCs, metals, and PCBs.

The #2 Forge Building contained 10 gas- and oil-fired rotary furnaces, which were used from 1944 to 1969 for the production of the 105-mm howitzer shells. In general, manufacturing processes within the Forge Building involved the slug shaping of the steel billets into projectiles through forging and heating operations, descaling units, hydraulic/piercing presses, and hydraulic drawing benches. Once shaped, the projectiles were cooled in spray and quench operations and then transported to Building #3 (Machining Building). Quench and spray operations involve the rapid cooling of hot castings by quenching in a water bath. These operations increased the cooling process and achieved certain metallurgical properties for the metals being prepared. The water may contain chemical additives to prevent oxidation. Other machinery used in producing the projectiles included sizing units, conveyors, accumulators, air hammers, cooling

tanks, oil heaters, cranes, metal grinders, transformers, and air compressor motors and cylinders. The draft EBS report noted that a pipeline tunnel entered building #2 from the north; the tunnel contained pipes that run from the former locations of the fuel oil storage tanks area (Building #8), and the fuel oil pump house (Building #8A). The first floor of building #2 once contained the fuel oil distribution system, hydraulic oil systems, and cooling tanks. The second floor contained transformers and switches. A former gasoline UST once located outside of the building was also utilized in the operations of Building #2. Some materials used in the forging and heating processes included solvents, acids, hydraulic oils, fuel oils, quench-water cooling oils/fluids, and machine lubricant oils. Contaminants associated with these materials and processes may include VOCs, SVOCs (including PAHs), PCBs, heavy metals, and possibly cyanide.

Furnace air emissions in Building #2 consisted of the products of combustion from the fuel and particulate matter in the form of dusts, metallics and metal oxide fumes. Carbon monoxide and organic vapors may also arise if oily scrap is charged to the furnace or preheat system. Particulates can include flash and heavy metals, and fumes are generated from the volatilization and condensation of molten metal oxides. Particulates may contain varying amounts of zinc, arsenic, lead, nickel, cadmium, and chromium. Carbon steel dust can be high in zinc, stainless steel dust is high in nickel and chromium, painted scrap can result in particulates high in lead, nonferrous metal production may contain copper, aluminum, lead, tin, and zinc.

The initial manufacturing operations (from 1941 to 1944) within the #3 Machining Building included the production of 0.30-mm caliber munitions. The draft EBS report did not specifically discuss the production processes involved, materials used, or wastes generated from this time frame; however, other available information from MDNR helped in filling in these data gaps and was summarized previously in this section.

Subsequent to 1944, Building #3 was retooled for the production of the 105-mm howitzer shells. The updated manufacturing operations included: shell shaping, heat and metal treating, cleaning, stripping, preserving, painting, and packaging. The new machinery used in Building #3 included lathes, welding equipment, hydraulic and drill presses, milling machines, grinders, heat treating furnaces, wash racks, welders, shapers, shot blasting equipment (to remove residual refractory material and oxides), paint spray booths, transformers, air compressors, dust collection devices, and conveyors. During this phase of munition production, the first floor of the building was used to store wastes (chemicals, oil, and greases) produced during these operations. The second floor was the location where the 105-mm shell casings were lathed and shaped with cutting/soluble oils containing PCBs. Metal shavings from this process were sent

to the basement through a "chip chute". SLOP records estimate that 146 tons of chip/metal shavings were generated every day, during their production rate of 650,000 shells per month. Greater amounts were generated when they attempted to reach a maximum capacity of 1 million shells per month. Records indicate that the chips/shavings were removed from Building #3 by using two-wheel chip carts to a chip chute/disposal elevator and finally into rail cars. The cleaning of the projectiles including chemical cleaning, and coating operations were done to remove scale, rust, oil, grease and dirt. Solvents, emulsifiers, pressurized water, abrasives, alkaline agents as well as acid pickling were used in these processes. The pickling process involved the cleaning of the metal surface with inorganic acids such as hydrochloric, sulfuric or nitric acids. The projectiles were coated and painted to prevent rust and to resist deterioration. Building #3 was also used for a machine, electrical, carpenter, and automotive shops. Wastes generated from the finishing operations probably included generation of particulate air emissions. Wastewater may have contained cutting oils, solvents and metals. Other wastes probably included metal chips and spent cutting oils. Wastes generated from the cleaning, coating operations and painting may have generated air emissions, and acid/metallic mists (including lead paint). Wastewater may have contained wash solutions including acids, solvents, metals, cyanides. Other wastes may include metal-bearing sludges, spent solvents and paints, (including lead paint). Contaminants associated with these wastes and the production processes of the 105-mm caliber shells include VOCs, SVOCs, heavy metals, and PCBs.

Building #4 (Air Compressor Building) formerly housed air compressors used to generate compressed air for processes performed in the other SLAAP buildings. Process machinery included compressor motors and cylinders, intercoolers and aftercoolers, and cyclone separators. It was reported in the draft EBS report that an electrical switching room located south of the air compressor room contained two transformers. Transformers were also once located immediately west of Building #4. Contaminants associated with these operations may include PCBs, VOCs, and possibly SVOCs.

Initial manufacturing operations, which occurred in Building #5, included a primer loading plant for 0.30-mm caliber munitions from 1941 to 1944 for the SLOP operations. In 1944, the building was converted to office space and was utilized as such until 1996, except between 1962 to 1967. During this time the building was utilized as an assembly plant and office which was leased to Futura Manufacturing Company for the production of small pocket-sized radios. No information was available regarding the processing and disposal practices of the Futura company. In addition, the draft EBS report did not indicate any areas of concern associated with the primer loading plant processes conducted in building #5 during the early 1940's. File information obtained from MDNR noted that brass was used for some of the primer

components. Press machines were used to punch alcohol-moistened foil, which was then placed into the primer cups. The primer mixture/charge, composed of high explosives of unknown composition (possibly nitroglycerine and/or trinitrotoluene) was placed by hand into each primer cup. Next, anvils were pressed over the primer cups, dried in ovens and stored for later insertion into brass cartridges. This information also noted that the explosives were stored within separate powder magazines and shipped into the plant in small quantities as needed for safety purposes. Other materials used would include cleaners, hydraulic oils, and transformer oils. Contaminants primarily associated with the primer-loading operations would include explosives (primer and tracer compounds), nitrates, perchlorates, VOCs, SVOCs, heavy metals, and PCBs.

Building #6 was used for small arms primer insertion from 1941 to 1944. The primer insertion machinery was removed and the building was converted into office space in 1944. The draft EBS report did not indicate any areas of concern associated with the primer insertion processes conducted in building #6 during the 1940's. Similar processes as noted above in Building #5 and previously in this section are thought to have occurred within this building (see above). During 1944 to 1969, a metallurgical laboratory occupied a small part of the first floor of Building #6 and performed quality control testing of the supplied steel, polishing, measuring, and metal etching. The EBS report indicated that liquid wastes were reported to have been disposed down the MSD drains from the laboratory area. In addition, ash from an open kiln was observed during the TetraTech site inspection. The use of the kiln is unknown. Materials used include unidentified laboratory chemicals, solvents, hydraulic oils, cleaners, and transformer oils. Contaminants primarily associated with these operations would include VOCs, SVOCs, explosives (primer and tracer compounds), nitrates, perchlorates, heavy metals, and PCBs.

From 1944 to 1969, Building #7 housed several water pumps used to circulate coolant water between Buildings #2 and #4 and a cooling tower (Building #7A). Water pumps and piping were the only process machinery used. No hazardous materials were identified as being associated with these operations.

The Fuel Storage Area (Building #8) operations included storage and transportation of fuel used by the rotary furnaces and process machinery in Building #2 (Forge Building) from 1944 to 1969. Fuel was transported by pumps located in Building #8A (Oil Pump House) into Building #2. Underground fuel lines originally ran from nine 16,000- to 19,000-gallon aboveground fuel oil tanks positioned within earthen dams located directly north of Building #2. In 1958 (as a result of I-70 construction), the fuel oil tanks were relocated east of Building #2, where it remained until 1986. Currently, the area east of Building #2 is occupied by a parking lot and an electrical substation. An oil drain sump, which was located near the

fuel storage tanks was used to temporarily store dirty return oil from Building #8A oil pumps. In 1986, the tanks were removed and donated to the state of Missouri. Possible contaminants associated with these operations include VOCs (benzene, toluene, ethylbenzene and xylenes (BTEXs), total petroleum hydrocarbons (TPHs), and polyaromatic hydrocarbons (PAHs), metals, and possibly PCBs.

The acetylene generation area (currently a parking lot) consisted of the Acetylene Generator Building (Building #9), the Carbide Storage Building (Building #9A), the Sludge Pits (Building #9B), the Oxygen Receiver (Building #9C), and the Driox Oxygen Converter (Building #9D). Building #9 was built in 1941 and was initially used for transfer of bulk powder into cans. The building was modified in 1944 to include the production of acetylene gas in four generators located in Building #9 by combining calcium carbide and water. The gas was then piped underground to Buildings #2 (Forge Building) and #3 (Machining Building) for various operations. Calcium hydroxide slurry, a caustic byproduct of this process, was stored in two sludge pits east of Building #9. The sludge pits were formerly connected to the sewer system by underground piping. Records indicated that the majority of the slurry was transported off-site by contractors. Materials used during these operations would include smokeless powder, calcium carbide (based on reactivity and flammability), and machining cooling oil; possible contaminants associated with these materials and processes may include VOCs, SVOCs, metals, pH, explosives, and possibly cyanide.

Building #10 consisted of quench oil storage tanks, a sludge pit, and a gasoline tank, which were used as support for the manufacturing processes of the plant. The tanks were used to supply cooling oil to 14 quench oil tanks for metal machining operations within Building #3 through underground and basement piping. All of the USTs and sludge pit were removed in 1993. Approximately 1,500 cubic yards of contaminated soil was excavated after the tanks and pit removal. The draft EBS report indicated that the USTs removal at the SLAAP site has not been finalized. This is a result of MDNR having outstanding issues concerning the UST final closure report and remaining contamination. Materials used during these processes include quench oil, hydraulic oil, solvents, and heavy metals. Contaminants may include VOCs (including BTEXs), SVOCs, metals, explosives and PCBs.

The Foamite Generator Building (Building #11) was used as support in the manufacturing processes of the plant. Foamite was generated in this building in order to fight fires at the SLAAP. Hydrolysate and ferric hydroxide and dry foamite powder were used in this generation process. No hazardous materials were reported to have been associated with this operation.

As a function of national security, an underground tunnel network was constructed, which is thought to have extended under the entire SLOP facility, including the SLAAP site. The existence of these tunnels

has been documented by MDNR and former ATCOM industrial hygiene staff. There were many purposes for these tunnels, which included: national security, firing range, possible explosives detonation ranges, transferral of materials, supplies, and equipment, and projectile/shell production between buildings. In addition, it was probably a mode of transportation for more than 34,000 SLOP workers. There is no knowledge at this time of any sampling having been conducted within the tunnels. Former ATCOM staff recommended that respiratory protection was necessary if the tunnels were to be entered.

Other waste types thought to be present at the SLAAP facility and observed by Tetra Tech includes asbestos and lead paint on and within the majority of the buildings. The extent, health risk, and disposition of these contaminants should be determined. In addition, pesticides were reportedly applied by a contractor. Those chemicals used included Rid-A-Bird (containing fenthion and avitrol with 4-aminopyridine), malathion and the herbicide 2,4,5-T ester. A Dames and Moore report in 1994 indicated finding pesticide (other than what was originally used by contractors) contamination. These two findings bring into question whether pesticides were merely applied or actually stored on SLAAP.

The U.S. Army Toxic and Hazardous Material Agency's, 1979 report noted that all sewage was discharged into the MSD system. Contaminated liquid and solid industrial wastes were collected in all sumps and holding tanks and were reportedly removed by a contractor, recycled, or possibly discharged to the MSD system. Several of the sumps/drains and pits in the SLAAP site were connected to the MSD sewer lines. No hazardous wastes are known to be buried at the SLAAP site, and no demolition or burning ground areas were reported on this facility. The 1979 report also noted that no holding or settling ponds or wastewater lagoons were utilized on this former federal facility, but that collection sumps were common. The report also noted that although there were no records indicating large spills of industrial chemicals or petroleum products, there was evidence of minor spills near valves, joints, and piping. Limited MSD information was available regarding MSD communications and permits. No MSD permits were held until after the mid to late 1960's at the SLAAP site.

Based on information from other federal facility sites, it is common that a method used to dispose of process wastewater and/or shift wash down water was to construct "french drains" and/or "dry wells" to allow wastewater to percolate into subsurface soils. These drains/wells would be constructed fairly deeply into subsurface soils to divert wastewater away from buildings. Further information is needed concerning whether these types of drainage systems exist at the SLAAP site.

It should be noted that SLAAP was a small quantity waste generator under RCRA until December 31, 1997, when the Army deactivated its RCRA status.

## PREVIOUS INVESTIGATIONS

Investigations have been conducted at the site for the remediation of Building #3 and the removal of the USTs and sludge pit (Building #10). The following information was obtained from available files.

Previous investigations of Building #3 pertain strictly to the building itself. Building #3 was originally utilized to finish metal projectile parts as a part of the munitions operations. Metal lathing operations were conducted on the second floor and metal finishing operations were done on the first floor. Both metal lathing and metal finishing operations utilized oil-cooling systems in order to reduce heat. Cutting oils with PCBs exhibited excellent heat transfer qualities and were historically used extensively in similar industrial applications. The specific cutting oil used at SLAAP is not known. An unconfirmed estimate by plant personnel of the PCB content in the cutting oil is that it contained between 50 to 150 parts per million (ppm).

AVSCOM had planned to renovate Building #3 into office space in the 1980's. The following investigation was a result of this renovation effort. On April 24, 1990, Larry Wright, director, Administrative and Installation Support, Department of the Army, AVSCOM sent a letter to Bob Jackson, Toxic Substances Control Section, USEPA Region 7, regarding the removal/disposal by Browning Ferris, Inc. (BFI), of creosote-treated wooden blocks that had been exposed to PCBs. In the correspondence, it was noted that General Services Administration (GSA) samples revealed a maximum of 288 ppm of Aroclor 1248 and that notice had been made to MDNR and EPA on April 6. The letter also outlined the short-term and long-term plans of action, which included removal of all concrete, mastic and wooden blocks, enclosure of file storage area, placement of masonite as a floor, and sampling of concrete subfloor and permanent flooring installation. EPA's May 9, 1990 response letter from Jackson recommended that contaminated areas be sampled and cleaned for future use and that compliance with 40 CFR Part 761 be accomplished with respect to disposition of contaminated equipment.

On January 2, 1991, Bob Kraeger of MDNR inspected Building #3. During this inspection, Kraeger took 16 wipe samples from various surfaces within the building. The results indicated that nine of the 16 samples had regulated levels of PCBs. No samples of the earthen floor or surrounding soils were taken. Subsequently, on February 20, 1991, EPA issued a Notice of Noncompliance TSCA Docket Number VII-91-T-304 for noncompliance with the National Spill Clean-Up Policy (40 CFR 761.125). EPA required that AVSCOM provide documentation of the removal of all contaminated flooring materials, and decontamination/confirmation sampling of nonporous surfaces to less than 10 micrograms/100 square

centimeters, and decontamination/confirmation sampling of porous surfaces to less than 10 ppm. On March 20, 1991, AVSCOM responded to the Notice of Noncompliance by noting how it would accomplish the remediation. In a letter dated May 28, 1993, Jackson of EPA to AVSCOM, Jackson outlined three additional areas that EPA believed should be addressed. Those areas included: 1) remediation of the chip chute wall, chip chute and basement, 2) encapsulation of an area within Building #3, and 3) statistically based sampling of contaminated areas. On June 24, 1996, US AVSCOM submitted to the EPA, Toxic Substances and Control Section a Health Based Risk Assessment (completed by Woodward-Clyde) for Building #3 as a portion of the requirements for the PCB remediation project as a result of the Notice of Noncompliance. In August 15, 1996, the Agency For Toxic Substances and Disease Registry (ATSDR) issued a Health Consult as a result of the Health Based Risk Assessment. This report documented PCBs located in the basement, first and second floors, and asbestos and pesticides in the basement. Soil and wipe samples taken by Dames and Moore (1994 study) from various surfaces in the basement detected 4,4'-DDD, 4,4'-DDT, endrin and gamma-BHC, dieldrin, heptachlor epoxide, and endrin aldehyde. ATSDR concluded that PCB levels (including soils in the basement) within Building #3 may represent a long-term health threat to future workers from direct contact exposures. They also concluded that the pesticides detected in soil samples did not represent a health threat. ATSDR recommended that the risk assessment completed by AVSCOM might not be representative of current conditions in Building #3.

The SLAAP facility had four known areas where USTs were located; east, north, and west of Building #2 and east of Building #3. No information was available regarding the 1958 and 1986 removal of fuel tanks located north and later relocated east of the #2 Forge Building. However, information pertaining to the USTs east of Building #3 was available. Two previous studies were conducted of this site: "Investigation of Underground Storage Tanks," September 1989 by the United States Corps of Engineers and "Underground Storage Tank Investigation," February, 1992 by J.D. Chelan.

The tanks east of Building #3 were reportedly taken out of service when munitions production was terminated in 1969. These tanks were drained of all product and filled with water. The J.D. Chelan report (in support of removal of the USTs east of Building #3) reported drilling 12 boreholes in the vicinity of the USTs in December 1991. From the report, it appeared that soil and tank media contents were sampled on December 11, 1991. The tanks contents were analyzed (for all but tank #105) for PCBs, metals and TPH. Soil samples were analyzed only for TPH and metals. Analytical results for tank contents and soils indicated that TPH was in excess of the cleanup levels. Analytical results for the tank contents indicated that PCBs levels were reported at less than 5.0 ppm for the sludge pit. All other PCB levels for all other tanks were reported at less than 0.001 ppm. This report also noted a black oil stain near Tank #17,

however, no sample was taken. One soil sample collected from an unconnected pipe north of tank #105, which contained a red "solvent-like" material, had BTEX compounds at a concentration of 477,200 ppm. The report concluded that the worst contamination in the UST area appeared to be between Tanks #17 and #87, at the southwest end of Tank #15, and around Tank #105.

A removal conducted by the remediation contractor, Action Environmental Services (from November 1992 through January 1993) included the removal of two gas tanks, #101 and #105, a sludge pit, and three quench oil tanks (#15, #17, #87). During the removal activities, a total of 1,500 cubic yards of soil were excavated and disposed in a landfill. Excavation of the soil was terminated by the remediation contractor at the contractual 1,500-cubic-yard quantity. Seven soil samples, which were analyzed for benzene, toluene, ethylbenzene, xylene (BTEX) and TPH, resulted in elevated concentrations of BTEX and TPH. No additional contamination was noted from any additional Resources Conservation and Recovery Act (RCRA) TCLP metals analyses. Soil samples were not analyzed for PCBs. It was reported during the removal that no leakage was found to have accumulated against the Building #3 foundation or along sewer lines beneath the tanks. It was noted however, that spillage of other contaminants unrelated to the UST removal was present in the excavations areas.

The US AVSCOM submitted to MDNR a Corrective Action Plan in April 1993 in order to finalize the tank removals. The results of the Corrective Action Plan are unknown and MDNR's response letter indicated concerns over remaining contamination.

In February 1999 Tetra Tech conducted an draft EBS for the AMCOM in Huntsville, Alabama. The draft EBS report was prepared to determine the environmental conditions of the property for consideration for acquisition, transfer, outgrant, or disposal. The scope of work for the draft EBS report consisted of the identification of probable areas of environmental concern that may be present on site or on the surrounding adjacent properties and that may pose an environmental liability for the resulting property owner. The draft EBS identified several areas of environmental concern throughout the property. Sampling recommendations were also addressed in the draft EBS report to assess the building-specific and site-wide areas of environmental concern.

## **SOURCE AND PATHWAY ASSESSMENT**

A PA score for the SLAAP site at 4800 Goodfellow Boulevard was calculated utilizing the computerized scoresheets (Version 2.1) dated April 1995. The PA score was based on readily available

file information, a limited target survey, and professional judgement. An overall PA score of 10 was calculated for this site. The ground water and surface water pathways scored a 1, and were believed to pose no threat to the environment and/or human health. The soil exposure pathway scored 2, with a potential exposure threat for nearby residential targets suspected. The air pathway scored a 20 based on no suspected release. The relatively high score for the air pathway is due to the dense population within close proximity of the site. Missing file information and HRS scoring deficiencies are highlighted separately in Attachment 3: HRS Scoring Deficiency Checklist.

## **SOURCE DESCRIPTION**

Limited information exists for the site concerning waste treatment, storage, and disposal practices since its inception as an munitions plant in 1941. Information concerning waste streams and hazardous constituent quantities is considered a data gap and an effort should be made in collecting this information if at all possible. Waste quantity as well as source delineation would most likely change the PA-score after additional sampling has been conducted at the site. Other potential source areas were identified during the file review and will be discussed below. Further sampling would be necessary to adequately document source areas at the SLAAP site. The draft EBS conducted by Tetra Tech resulted in identifying building-specific areas of environmental concern throughout all remaining structures on site. Site-wide areas of environmental concern were also identified during their survey and consist of possible ground water contaminant migration from the PURO Chemical Storage company located south of the site, as well as possible asbestos-containing materials and lead-based paint present in many buildings across the site. START believes that the Tetra Tech site assessment and recommendations were good and should be implemented; however START recommends additional sampling to fully characterize the site identity and potential source(s) and to document potential releases.

Potential sources identified at the site and used for PA scoring include the former fuel oil storage area (Building #8), the former quench oil tanks and sludge pit area (Building #10), and the former sludge pit area located adjacent to Building #9. These buildings no longer exist at the property and removal activities have occurred at Buildings #8 and #10, including some soil removal in the former quench oil tanks and sludge pit area near Building #10. Available records and interviews with state officials have indicated that the storage tank removals at the SLAAP site have not been finalized. Previous analytical data has also indicated that a release to subsurface soils and possibly ground water has occurred in the area of the former Building #10. Many other potential source areas may exist throughout the site. The potential source areas

identified for PA scoring were based on available file information, limited analytical results, and professional judgment.

START suggests that more extensive soil sampling throughout the site and mainly outside the buildings be conducted to adequately assess whether contaminant releases have occurred due to the former operations at the site. Field screening sampling could be conducted to assess potential source areas and to determine the extent of soil contamination for site characterization and for proper removal assessment. Confirmation samples would also be necessary to verify on-site screening samples. Soil sampling may be more extensive in some areas depending on the results of the field screening data. Additional potential sources/areas of concern are listed below with sampling considerations for possible further work at the SLAAP site.

### **Data Gaps**

**Building #1**—Soil samples should be collected in areas along the outside of building #1 to assess whether any spills or leaks may have occurred. Emphasis should be in areas where wastewater discharged from the building to assess the integrity of the underground piping system. Several pit areas are located within building #1 along the south and southeast walls. These pits or hazardous material off-loading areas formerly discharged directly to the sewer system. Subsurface soil contamination outside of the building may have occurred in these areas. Drilling through the adjacent parking lots (formerly billet storage yards) could be conducted for the collection of a subsurface soil sample from each storage yard. START also recommends that all samples collected within and outside of the building should be analyzed for metals. It was also recommended in the EBS report that samples collected inside of the building be analyzed for VOCs, SVOCs, and PCBs due to solvents, acids, and oils having been used within this building. START also recommends that soil samples collected outside of the building in selected areas be analyzed for the same analytes.

**Building #2**—Perimeter soil samples should be collected around Building #2, with emphasis on fuel oil pipeline areas, the storm sewer catch basins located on the west, south, and east sides of the building, and the fuel oil loading pits once located east and west of the pipeline tunnel, which exited the building on the north. Soil sampling should also be conducted in the vicinity of the former gasoline UST located between Building #2 and Goodfellow Boulevard. Because of the presence of petroleum hydrocarbons, samples should be analyzed for VOCs and SVOCs (including PAHs). Metals should also be added to the analyte list for samples collected in the rotary furnace areas within the building as well as for soil samples collected outside of the building. Selected soil samples outside of the building should also be analyzed for PCBs. Wipe samples should also be collected within the building and analyzed for PCBs and metals due to the forging operations and the possible presence of metals-contaminated dusts.

**Building #3**—Perimeter soil samples should also be collected around Building #3 with emphasis on the four loading dock areas and former quench oil remote fill area located along the north-northeast side of the building to assess potential spills and leaks that may have occurred in these areas. Samples collected from these areas should be analyzed for VOCs, SVOCs (including PAHs), PCBs, and heavy metals. It has also been reported by MDNR that a portion of Building #3 has an earthen floor. Surface and subsurface soil samples should be collected in this area and analyzed for pesticides, metals, and PCBs. Metals should be added to the analyte list for soil and wipe samples collected in

the basement of Building #3, particularly in the area of the former "chip chute" area. In addition to the soil-boring sample collected within the sewer and solvent room drain connection, all other floor drains should be assessed and possibly sampled to determine whether building-related contaminants are remaining in these areas and contaminating the deeper soils.

**Building #4**—It was recommended in the EBS report that soil samples be collected within the former motor pit areas located in Building #4. START suggests that additional surface soil samples (if possible) be collected along the exterior of Building #4 in the areas of the former transformer storage area located at the southeast corner of the building to assess whether any leaks have occurred. Further, three to four soil samples should also be considered along the pipe vault and outlet areas located along the east and west sides of the building. All samples collected within and outside of Building #4 should be analyzed for VOCs, SVOCs, and PCBs.

**Building #5 and Building #6**—The EBS report indicated very minimal sampling within Buildings #5 and #6. Recommendations included the sampling of ash in the open hearth/kiln area in Building #6 and spilled oil in Building #5. Historically, these two buildings were utilized for primer (small cap/tube containing an explosive) insertion operations from 1941 to 1944 for the production of small (0.30-mm) caliber munitions. START recommends that wipe samples be collected within the building and that soil samples be collected along the perimeter of the building; all samples should be analyzed for explosives (primer and tracer compounds), nitrates, and perchlorates. Selected soil samples should also be analyzed for VOCs, SVOCs, heavy metals, and PCBs because of the use of solvents and oils used in the primer insertion processes and the presence of transformers. Additional historical information should also be collected concerning the manufacturing of the 0.50-mm caliber munitions to assess the processes involved in its production. Information concerning the manufacturing processes of the Future Company (produced pocket-sized radios) and the former metallurgical laboratory located in Building #6 should also be collected and evaluated for additional sampling.

**Buildings #8 and #8A**—Subsurface soil samples should be collected in the former fuel oil storage area (formerly the location of nine fuel oil ASTs and oil pump house) and in the former underground fuel oil piping system/tunnel, which connected with Building #2 (Forge Building) and Building #8A (Oil Pump House). Currently, the area east of Building #2 is occupied by a parking lot and an electrical substation. The EBS report indicated collecting subsurface soil samples in these areas from five soil boring locations. START recommends collecting additional subsurface soil samples in these areas utilizing a Geoprobe™ hydraulic unit and mobile laboratory for screening of BTEX compounds to assess the full extent of subsurface soil contamination. Subsurface soil samples should also be collected and screened for BTEXs south and southwest of the former electric substation, because this area also formerly housed the fuel oil storage area. Surface soil samples (if possible) should also be collected around the perimeter of the electrical substation and screened for PCBs analyses. Confirmation soil samples should be collected and submitted to a laboratory for VOCs, TPHs, SVOCs, metals, explosives, and PCBs analysis.

**Buildings #9 and #10**—Currently, the area where Building #9 (Acetylene Generation Area) and Building #10 (Quench Oil Tanks and Sludge Pit Area) were situated is a paved parking lot. The EBS report indicated collecting one subsurface soil sample at the sludge pit area (Building #9B) and four subsurface soil samples along the perimeter of Building #10. START recommends that additional soil borings be completed in all former sludge pit and gasoline and quench oil tank areas for a total of seven subsurface soil samples. Samples may also be warranted in areas where underground piping is located which connected this area with Building #2 (Forge Building) and #3 (Machining Building). Previous investigations have indicated elevated BTEXs and TPH concentrations in the area of Building #10, and MDNR has indicated some concerns that the previous UST removal investigation was not

adequate and contamination may remain in the area. Samples could be collected with a Geoprobe™ hydraulic unit and screened for BTEX and PCB compounds to determine the full extent of subsurface soil contamination in the areas of Buildings #9 and #10. Confirmation soil samples should be collected and submitted to a laboratory for VOCs, TPHs, SVOCs, PCBs, metals, and explosives.

It has been reported by MDNR and a former ATCOM employee that an underground tunnel system extends under the entire SLOP facility, including the SLAAP site. Further assessment of this tunnel system is warranted and selected soil samples should be collected and at a minimum analyzed for metals and explosives due to the existence of firing and explosive detonation ranges. In addition, "french drains and/or dry wells" may exist on the SLAAP site and warrant further investigation as to their existence. If located, sampling should be conducted in these areas to assess whether a direct release to subsurface soils and possibly ground water has occurred.

## **GROUND WATER PATHWAY**

Previous investigations have indicated that total petroleum hydrocarbons (TPHs), metals, and PCB contamination exists in soils near the former quench oil tanks/sludge pit area (former Building #10). In addition, PCB contamination has been detected at elevated levels in Building #3, and it has been reported by MDNR that a portion of the basement in Building #3 is earthen and may contain PCBs. Information from the draft EBS report has also indicated that contamination exists within buildings and former building areas across the site. Subsurface soils are expected to be contaminated in other areas throughout the site and presumably contributing to on-site ground water contamination. There is the potential for VOCs, SVOCs, metals, and explosives to be present within the ground water, based on the former SLAAP operations. A former ATCOM industrial hygienist and MDNR have indicated that an underground network of tunnels are situated under the SLAAP site and formerly used for plant operations. These tunnels may possibly be a conduit for deeper subsurface soil contamination. The aquifer underlying the site is the Mississippian aquifer and the top of the water table is thought to be about 65 feet below ground surface (BGS).

Additional soil sampling needs to be conducted to adequately document waste quantity and source areas throughout the site. No primary targets were evaluated for the ground water pathway. Ground water targets within a 4-mile radius are considered secondary targets. Currently, only two private wells at depths of 340 feet and 380 feet BGS were identified by the State. These wells are used for drinking water purposes and are located about 3 miles from the SLAAP site. No municipal wells are located within a 4-mile radius of the site. A score of 1 was calculated for the ground water pathway.

## **Data Gaps**

Ground water samples should be collected at the site to document ground water contamination (if present) and to attribute ground water contamination to a source. The draft EBS report indicated a total of three monitoring wells to be installed at the site including: one upgradient well installed at the western property boundary, another upgradient well along the southern property boundary, and one on-site monitoring well near former Building #10. START suggests that an additional three to four monitoring wells should be installed near (downgradient) identified source areas. Ground water releases near several buildings (i.e., Buildings #3, and #8) may be occurring due to former federal facility operations. An additional monitoring well should be installed along the northern and eastern property boundary to assess downgradient (off-site) ground water quality. This would help determine whether a ground water release is occurring off-site relative to ground water flow. The installation and sampling of temporary Geoprobe™ wells could be utilized for ground water characterization. The wells installed along the eastern and southern property boundary would be adequate locations for background wells. A thorough on-site geologic evaluation to determine the stratigraphic characteristics, including confining units, should also be further evaluated at the SLAAP site. No nearby drinking water targets exist for the site; therefore, sampling ground water targets is not warranted.

## **SURFACE WATER PATHWAY**

The closest surface water of significance is the Mississippi River, located about 2.65 miles downstream to the east of the site. Flooding is also not a concern at the facility, as it is located near a topographic high. The exposure threat to any potential targets along the Mississippi River would be low due to the distance of the Mississippi River (> 2 miles) and the high dilution factor of the river (> 10,000 cfs). It has been reported that a number of the buildings contained subfloor drains, pits, and underground piping, which eventually discharges to the St. Louis MSD system. In addition, surface drainage from the site during rainfall events eventually discharges to the St. Louis sewer system. File information was not found regarding historical compliance with MSD permits. The facility is currently inactive. No primary targets were evaluated. A PA-score of 1 was calculated for this pathway, with no suspected release to a surface water body evaluated.

## **Data Gaps**

An assessment to verify whether a site-related release has occurred should be made. The draft EBS report indicated sampling at direct discharge points from areas within the buildings (i.e., pits and piping

directly connected to the sewer system in several buildings). These discharge points warrant sampling as well as any other identified sewer inlets/catch basins located outside of the buildings and utilized during high rainfall events to collect surface drainage from the site. These surface water samples would verify contamination (if present) prior to discharging into the St. Louis MSD system. Sampling surface water targets (Mississippi River) does not appear to be warranted. Additional information is needed concerning the facility's combined storm/sanitary system layout and construction.

## **AIR AND SOIL EXPOSURE PATHWAYS**

The potential for an air release via the site is considered low. The air pathway score is relatively high due to the dense population in the vicinity of the site. The total population within 4 miles of the site, as determined by the Geographic Modeling System (GEMS) database, is about 264,235. Approximately 17,928 people reside within a 1-mile radius of the site. Historically, air emissions from plant operations may have caused soil contamination; however, the facility is currently inactive.

Limited analytical data exist for the site documenting surface and subsurface soil contamination. File information indicated soil contamination in some areas at the site (i.e., Building #10); however, a cleanup and removal of soils has been conducted. Soil contamination is suspected in areas across the site. Additionally, due to the presence of tunnels underneath the SLAAP/SLOP facility, there is the potential for subsurface soils within this underground pathway to be contaminated as a result of the variety of usages. It should be noted that during the site visit conducted by Tetra Tech, no visible signs of surface soil contamination were identified. The majority of the facility is asphalt and concrete covered with about a total of about 3 acres of grassy/soil areas.

Since the full extent of contamination has not been totally identified at the SLAAP site, it is difficult to assess whether any residential targets are situated within 200 feet of a contaminated source area. Residential properties do exist directly to the west and northwest. This area has been residential ever since the construction of the SLAAP facility in 1941. A school is located about 500 feet southwest of the site. These properties warrant sampling based on knowledge of the SLOP/SLAAP operations. There are no workers currently on site; however, a draft EBS evaluation to determine environmental conditions at the SLAAP is being conducted for possible property transfer, acquisition, or disposal. A score of 20 was calculated for the air pathway and a score of 2 was calculated for the soil exposure pathway.

## **Data Gaps**

An evaluation of the underground tunnel network should be conducted at the site. This evaluation may warrant soil and air sampling to assess the environmental hazards of the tunnels. Surface soil samples (0-2 feet) should be collected within 200 feet of potential workplace areas to assess the exposure threat to any future on-site workers/residents of the property. These soil samples would also help in assessing source characterization. Residential targets (nearby homes and school) need to be further evaluated and may also warrant sampling.

## **CONCLUSIONS AND RECOMMENDATIONS**

Based on the available information, further action should be taken at the SLAAP site at 4800 Goodfellow Boulevard. Previous investigations as well as the draft EBS investigation have indicated potential areas of environmental concern within site buildings and in areas of former buildings. In addition, it has been reported that the facility had poor waste handling practices. Future work should include sampling in areas addressed in the draft EBS investigation to assess potential environmental liabilities associated with property transferrals. In addition, sampling outlined in this memorandum should be considered to better assess whether releases have occurred due to past operations and to identify the extent and migration of contamination. START recommends that surface and subsurface soil, surface water, and ground water sampling be conducted to confirm or deny the presence of contamination. Background samples for all media would also be needed to establish appropriate background concentrations. Sampling parameters should consist of VOCs, SVOCs (including PAHs), TPHs, total metals, explosives (primer and tracer compounds), nitrates, perchlorates, PCBs, and pesticides. An evaluation of the tunnel network should be completed to assess whether any health concerns exist. These tunnels should be considered a part of the infrastructure of this site with respect to the environmental liabilities and subsequent remediation efforts.

A low PA-score of 10 was calculated for the site due to the limited number of targets. A low exposure threat appears to exist for ground water and surface water targets. The ground water pathway score would remain low due to the limited use of ground water as a drinking water source. An exposure threat to surface water is minimal due to the 2.65-mile downstream distance from the site and the high dilution factor of the Mississippi River.

In addition, a low exposure threat via air appears to exist; however, an exposure threat may exist for any future workers/residents that may work/reside on the property. An assessment of the exposure threat

would be better evaluated after on-site sampling is conducted and the future land use of the property is determined. Nearby residential properties may also warrant sampling due to the past operations at the site.

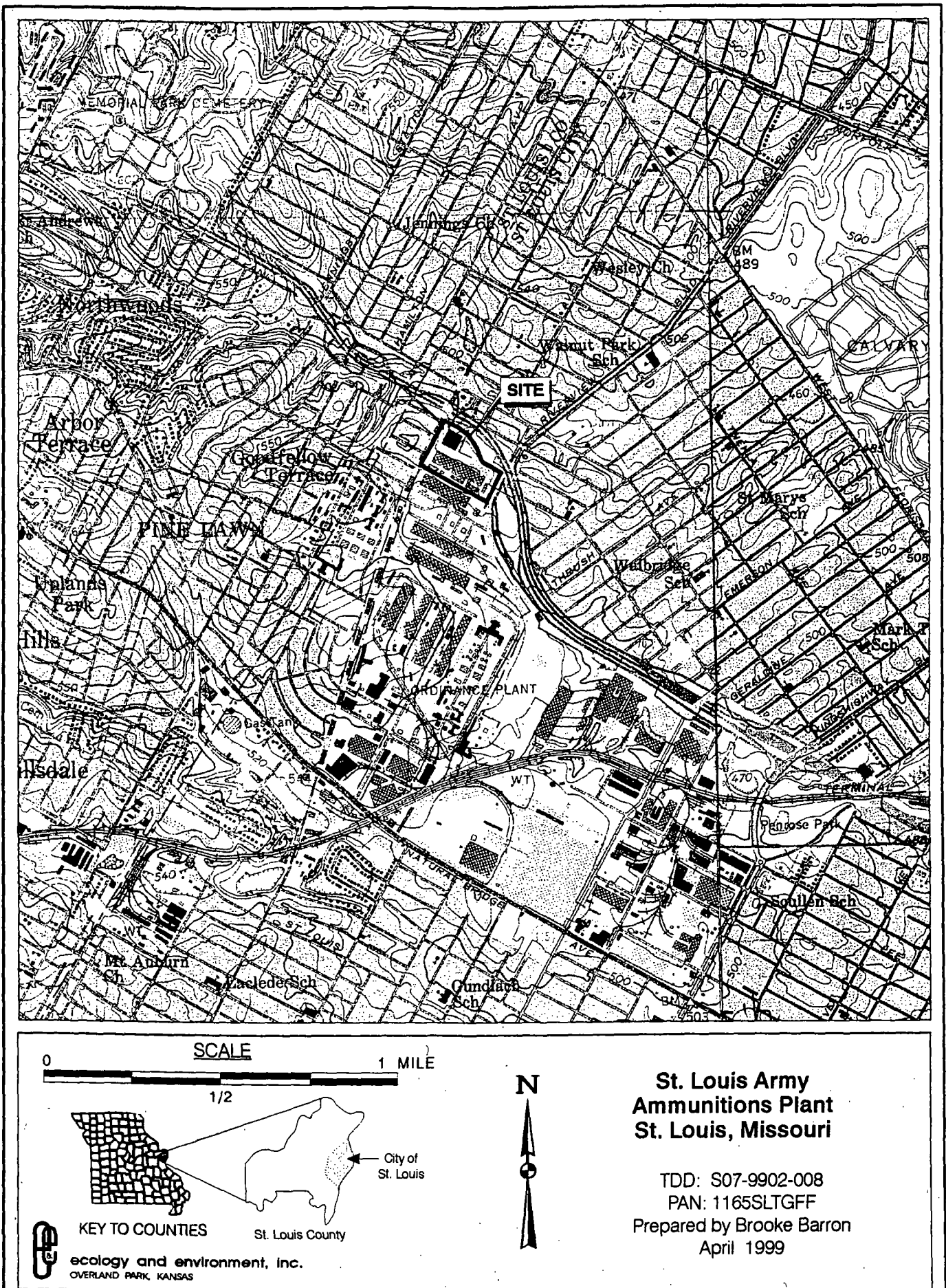
**ATTACHMENTS:**

1. Figures 1 and 2
2. PA Form and Scoring Worksheets with Reference List
3. HRS Scoring Deficiency Checklist

## **ATTACHMENT 1**

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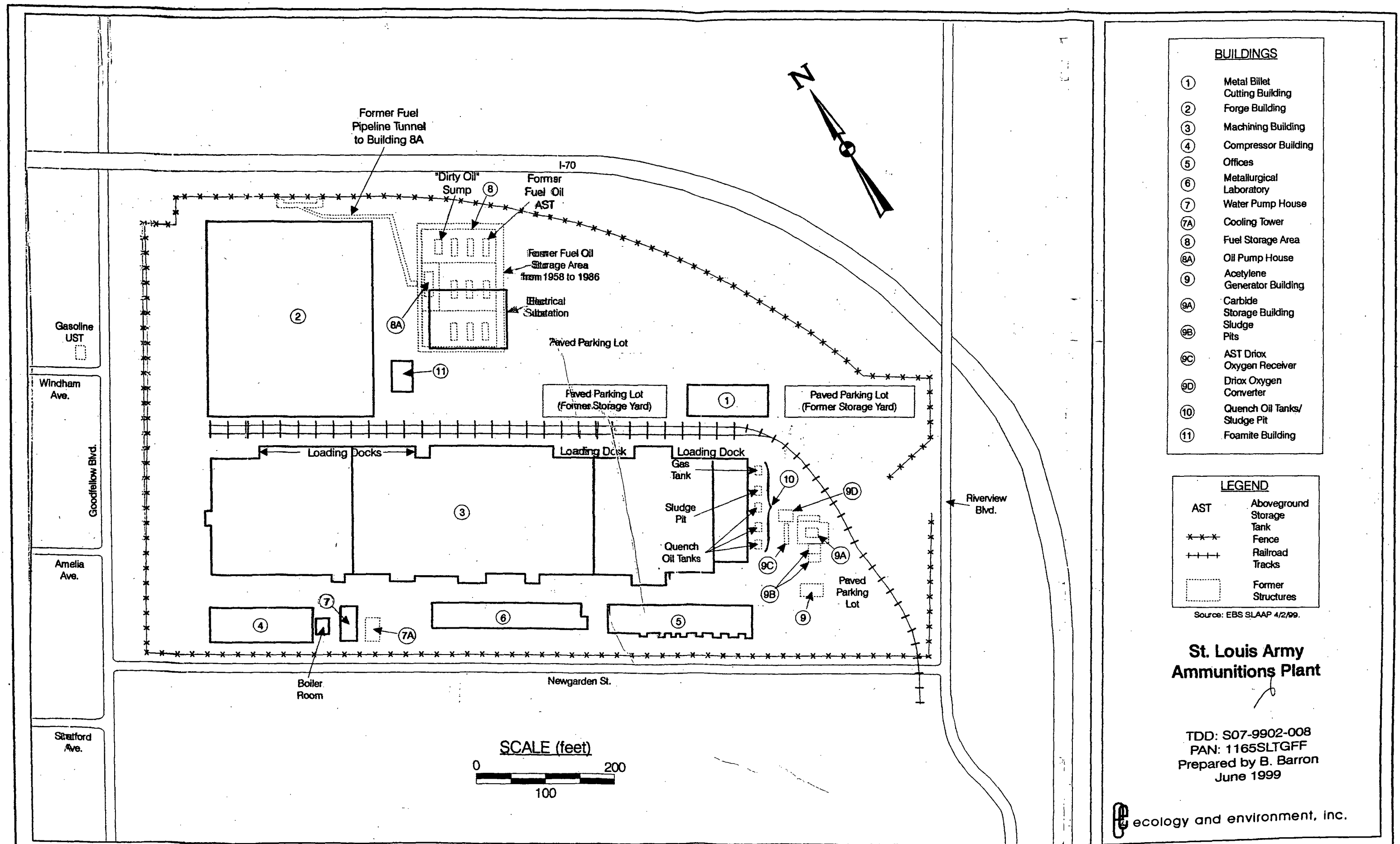
**Figure 1 and 2**



STLSTLC.CDR

Source: USGS 7.5 minute series,  
 1971, Clayton, MO Quad,  
 1982, Granite City, MO Quad.

Figure 1: Site Location Map



## St. Louis Army Ammunitions Plant

TDD: S07-9902-008  
PAN: 1165SLTGFF  
Prepared by B. Barron  
June 1999

ecology and environment, inc.

Figure 2: Site Map

## **ATTACHMENT 2**

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### **PA Form and Scoring Worksheets with Reference List**

**DRAFT**

PA-Score 2.1 Scoresheets  
St. Louis Army Ammunition Plant - 06/21/99

Page: 1

OMB Approval Number: 2050-0095  
Approved for Use Through: 4/95

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM				IDENTIFICATION			
				State: MO		CERCLIS Number: MO4210021222	
				CERCLIS Discovery Date: 06/01/84			
1. General Site Information							
Name: St. Louis Army Ammunition Plant			Street Address: 4800 Goodfellow Blvd.				
City: St. Louis		State: MO	Zip Code: 63120	County: St. Louis	Co. Code: Cong. Dist:		
Latitude: 38° 40' 11.5" Longitude: 90° 15' 9.8"		Approx. Area of Site: 21 acres		Status of Site: Inactive			
2. Owner/Operator Information							
Owner: AMCOM			Operator: none				
Street Address:			Street Address:				
City: Huntsville			City:				
State: AL	Zip Code:	Telephone:	State:	Zip Code:	Telephone:		
Type of Ownership: Federal Agency			How Initially Identified: Federal Program				

**DRAFT**

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM		IDENTIFICATION	
		State: MO	CERCLIS Number: MO4210021222
		CERCLIS Discovery Date: 06/01/84	
3. Site Evaluator Information			
Name of Evaluator: Martha Kopper		Agency/Organization: Ecology & Environment, Inc.	Date Prepared: 04-01-99
Street Address: 4358A Rider Trail North		City: St. Louis	State: MO
Name of EPA or State Agency Contact: Diana Bailey		Telephone: 913-551-7717	
Street Address: 726 Minnesota Ave		City: Kansas City	State: KS
4. Site Disposition (for EPA use only)			
Emergency Response/Removal Assessment Recommendation: No	CERCLIS Recommendation: Other	Signature:	
Date:	Date:	Name:	
		Position:	

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO4210021222
	CERCLIS Discovery Date: 06/01/84	

### 5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site: Industrial DOD Other Federal Agency:	Site Setting:  Urban	Years of Operation: Beginning Year: 1944  Ending Year: 1969
Type of Site Operations: Manufacturing Paints, Varnishes Industrial Organic Chemicals Primary Metals Metal Coatings, Plating, Engraving Metal Forging, Stamping Electronic Equipment Other Manufacturing DOD RCRA Small Quantity Generator	Waste Generated: Onsite	
	Waste Deposition Authorized By: Present Owner	
	Waste Accessible to the Public No	
	Distance to Nearest Dwelling, School, or Workplace: 250 Feet	

### 6. Waste Characteristics Information

Source Type      Quantity      Tier Contaminated soil    3.05e+04 sq ft    A Contaminated soil    5.34e+03 sq ft    A Contaminated soil    6.00e+02 sq ft    A	General Types of Waste: Metals Organics Solvents Paints/Pigments Pesticides/Herbicides Acids/Bases Oily Waste Explosives Other:
Tier Legend C = Constituent    W = Wastestream V = Volume        A = Area	Physical State of Waste as Deposited Solid Liquid Sludge Powder

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM		IDENTIFICATION	
		State: MO	CERCLIS Number: MO4210021222
		CERCLIS Discovery Date: 06/01/84	
7. Ground Water Pathway			
Is Ground Water Used for Drinking Water Within 4 Miles: No  Type of Ground Water Wells Within 4 Miles: Private	Is There a Suspected Release to Ground Water: Yes	List Secondary Target Population Served by Ground Water Withdrawn From:	
Depth to Shallowest Aquifer: 65 Feet  Karst Terrain/Aquifer Present: No	Have Primary Target Drinking Water Wells Been Identified: No	0 - 1/4 Mile 0 >1/4 - 1/2 Mile 0 >1/2 - 1 Mile 0 >1 - 2 Miles 0 >2 - 3 Miles 5 >3 - 4 Miles 0 Total 5	
	Nearest Designated Wellhead Protection Area: None within 4 Miles		

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO4210021222
	CERCLIS Discovery Date: 06/01/84	

8. Surface Water Pathway	Part 1 of 4
--------------------------	-------------

Type of Surface Water Draining Site and 15 Miles Downstream: River	Shortest Overland Distance From Any Source to Surface Water:  13992 Feet 2.6 Miles
Is there a Suspected Release to Surface Water: No	Site is Located in: > 500 yr floodplain

8. Surface Water Pathway	Part 2 of 4
--------------------------	-------------

Drinking Water Intakes Along the Surface Water Migration Path: Yes		
Have Primary Target Drinking Water Intakes Been Identified: No		
Secondary Target Drinking Water Intakes:		
Name	Water Body/Flow(cfs)	Population Served
None	minimal stream/ <10	0
	Total Within 15 Miles:	0

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO4210021222
	CERCLIS Discovery Date: 06/01/84	

8. Surface Water Pathway	Part 3 of 4
--------------------------	-------------

Fisheries Located Along the Surface Water Migration Path: Yes

Have Primary Target Fisheries Been Identified: No

Secondary Target Fisheries:

Fishery Name	Water Body Type/Flow(cfs)
Mississippi River	large river/ >10000

8. Surface Water Pathway	Part 4 of 4
--------------------------	-------------

Wetlands Located Along the Surface Water Migration Path? (y/n) Yes

Have Primary Target Wetlands Been Identified? (y/n) Yes

Secondary Target Wetlands:

None

Other Sensitive Environments Along the Surface Water Migration Path: Yes

Have Primary Target Sensitive Environments Been Identified: No

Secondary Target Sensitive Environments:

Water Body/Flow(cfs)	Sensitive Environment Type
large river/ >10000	Habitat for Federally designated endanger

POTENTIAL HAZARDOUS  WASTE SITE  PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: MO	CERCLIS Number: MO4210021222
	CERCLIS Discovery Date: 06/01/84	

9. Soil Exposure Pathway

Are People Occupying Residences or  
Attending School or Daycare on or  
Within 200 Feet of Areas of Known  
or Suspected Contamination: No

Number of Workers Onsite: None

Have Terrestrial Sensitive Environments Been Identified on or Within  
200 Feet of Areas of Known or Suspected Contamination: No

10. Air Pathway

Total Population on or Within:	
Onsite	0
0 - 1/4 Mile	1607
>1/4 - 1/2 Mile	4337
>1/2 - 1 Mile	17928
>1 - 2 Miles	56371
>2 - 3 Miles	76785
>3 - 4 Miles	107207
Total	264235

Is There a Suspected Release to Air: No

Wetlands Located  
Within 4 Miles of the Site: No

Other Sensitive Environments Located  
Within 4 Miles of the Site: No

Sensitive Environments Within 1/2 Mile of the Site:  
None

**DRAFT**

OMB Approval Number: 2050-0095  
Approved for Use Through: 4/95

# PA-Score

## PA SCORESHEETS

Site Name: St. Louis Army Ammunition Plant  
CERCLIS ID No.: MO4210021222  
Street Address: 4800 Goodfellow Blvd.  
City/State/Zip: St. Louis, MO 63120

Investigator: Martha Kopper  
Agency/Organization: Ecology & Environment, Inc.  
Street Address: 4358A Rider Trail North  
City/State: St. Louis, MO

Date: 04-01-99

**DRAFT**

WASTE CHARACTERISTICS

Waste Characteristics (WC) Calculations:

- |   |                   |        |          |          |
|---|-------------------|--------|----------|----------|
| 1 #8/Fuel Oil Area  | Contaminated soil | Ref: 1 | WQ value | maximum  |
| Area  | 3.05E+04 sq ft    |        | 8.97E-01 | 8.97E-01 |
| An open area surrounded by an earthen berm formerly contained 9 ASTs to store fuel oil for rotary furnaces in Building #2. Currently the area is a parking lot and electrical substation. Also use to be loading pits located west and east along north side of Building #2. An oil pump house and fuel line also were located in the area. The tanks and pump house and fuel line have been removed but residual soils are thought to remain in the area where Building #8 was once located. A potential contaminated soil area of about 30,500 square feet has been estimated for scoring purposes. |                   |        |          |          |
| Ref: 1  |                   |        |          |          |
| 2 #10/Oil Tanks/Pit   | Contaminated soil | Ref: 1 | WQ value | maximum  |
| Area  | 5.34E+03 sq ft    |        | 1.57E-01 | 1.57E-01 |
| Building #10, formerly the location of a sludge pit and quench oil tanks remains a potential source area of concern. All tanks and pit were removed during a 1993 removal; however contaminated soil most likely remains in the area. BTEX compounds have been detected in the areas as high as 477,200 ppm. According to the EBS report this area (Building #10) remains a area of concern for MDNR. A no further action letter has not been issued by MDNR concerning this area. An approximate area of 5,340 square feet was estimated for scoring purposes.                                       |                   |        |          |          |
| Ref: 1, 13  |                   |        |          |          |
| 3 #9/Sludge Pits  | Contaminated soil | Ref: 1 | WQ value | maximum  |
| Area  | 6.00E+02 sq ft    |        | 1.76E-02 | 1.76E-02 |
| Sludge pits used in the acetylene generation area (Building #9 & #9A) constitute an area of concern. These sludge pits were used to store the byproduct caustic calcium hydroxide. Contaminated soils are thought to remain in the area and an area of approximately 600 square feet was estimated for scoring purposes.  |                   |        |          |          |
| Ref: 1  |                   |        |          |          |

WQ total 1.07E+00

\*\* Only First WC Page Is Printed \*\*

Waste Characteristics Score: WC = 18

Ground Water Pathway Criteria List  
Suspected Release

Are sources poorly contained? (y/n/u)	Y
Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	U
Is precipitation heavy? (y/n/u)	N
Is the infiltration rate high? (y/n/u)	N
Is the site located in an area of karst terrain? (y/n)	N
Is the subsurface highly permeable or conductive? (y/n/u)	N
Is drinking water drawn from a shallow aquifer? (y/n/u)	N
Are suspected contaminants highly mobile in ground water? (y/n/u)	Y
Does analytical or circumstantial evidence suggest ground water contamination? (y/n/u)	Y

Other criteria? (y/n) N

SUSPECTED RELEASE? (y/n) Y

Summarize the rationale for Suspected Release:

Previous investigations have indicated total petroleum hydrocarbons, metals, and PCB contamination in the area of the former Building #10. Information from the Environmental Baseline Survey by Tetra Tech revealed that contamination at the site is much more widespread, including soil contamination within Building #3. Subsurface soils are expected to be contaminated throughout the former facility and presumably contributing to onsite groundwater contamination. A former ATCOM industrial hygienist (IH) indicated to START that an underground network of tunnels are situated under the SLAAP/SLOP facilities. These tunnels were used for various purposes and include transportation of equipment and supplies, and munitions. In addition, test firing munitions was also conducted along some tunnels. These tunnels may possibly be a conduit for deeper subsurface soil contamination. The aquifer underlying the site is the Mississippian aquifer and the top of the water table is thought to be able 65 feet below ground surface.

Ref: 1,2,6,7,28

Ground Water Pathway Criteria List  
Primary Targets

Is any drinking water well nearby? (y/n/u)	N
Has any nearby drinking water well been closed? (y/n/u)	N
Has any nearby drinking water well user reported foul-testing or foul-smelling water? (y/n/u)	N
Does any nearby well have a large drawdown/high production rate? (y/n/u)	N
Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance? (y/n/u)	U
Does analytical or circumstantial evidence suggest contamination at a drinking water well? (y/n/u)	U
Does any drinking water well warrant sampling? (y/n/u)	U

Other criteria? (y/n) N

PRIMARY TARGET(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Targets:

No municipal wells are located within four miles of the SLAAP site. MDNR indicated that the closest private drinking water wells are located about three miles from the site. There are no known reports of drinking water contamination as a result of the SLAAP facility.

Ref: 2,3,6

GROUND WATER PATHWAY SCORESHEETS

Pathway Characteristics

Pathway Characteristics			Ref.
Do you suspect a release? (y/n)	Yes	.....	
Is the site located in karst terrain? (y/n)	No	2	
Depth to aquifer (feet):	65	1,6	
Distance to the nearest drinking water well (feet):	13560	6	
LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550	.....	.....
2. NO SUSPECTED RELEASE	.....	0	
LR =	550	0	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0	.....	.....
4. SECONDARY TARGET POPULATION Are any wells part of a blended system? (y/n) N	1	0	
5. NEAREST WELL	3	0	
6. WELLHEAD PROTECTION AREA None within 4 Miles	0	0	
7. RESOURCES	5	0	
T =	9	0	.....

WASTE CHARACTERISTICS

WC =

18	0
----	---

GROUND WATER PATHWAY SCORE:

1
---

Ground Water Target Populations

Primary Target Population Drinking Water Well ID	Dist. (miles)	Population Served	Reference	Value
None				
*** Note : Maximum of 5 Wells Are Printed ***				Total

Secondary Target Population Distance Categories	Population Served	Reference	Value
0 to 1/4 mile	0		0
Greater than 1/4 to 1/2 mile	0		0
Greater than 1/2 to 1 mile	0		0
Greater than 1 to 2 miles	0		0
Greater than 2 to 3 miles	5		1
Greater than 3 to 4 miles	0		0
Total			1

Apportionment Documentation for a Blended System

MDNR-Division of Geology and Land Survey identified two wells which are located about 2.5 and 2.8 miles to the northeast and southwest of the SLAAP site. Wells are about 380 feet and 340 feet deep and serve a business and a residential property.

Ref: 2,6

Surface Water Pathway Criteria List  
Suspected Release

Is surface water nearby? (y/n/u)	N
Is waste quantity particularly large? (y/n/u)	U
Is the drainage area large? (y/n/u)	N
Is rainfall heavy? (y/n/u)	N
Is the infiltration rate low? (y/n/u)	N
Are sources poorly contained or prone to runoff or flooding? (y/n/u)	Y
Is a runoff route well defined(e.g.ditch/channel to surf.water)? (y/n/u)	N
Is vegetation stressed along the probable runoff path? (y/n/u)	U
Are sediments or water unnaturally discolored? (y/n/u)	U
Is wildlife unnaturally absent? (y/n/u)	U
Has deposition of waste into surface water been observed? (y/n/u)	N
Is ground water discharge to surface water likely? (y/n/u)	N
Does analytical/circumstantial evidence suggest S.W. contam? (y/n/u)	N

Other criteria? (y/n) N

SUSPECTED RELEASE? (y/n) N

Summarize the rationale for Suspected Release:

There is no suspected release into a surface water body. The closest surface water of significance is the Mississippi River, located about 2.65 miles to the east of the site. Flooding is also not a concern at the facility, as it is thought to be located on a topographic high. The exposure threat to any potential targets along the Mississippi River would be low due to the distance to the nearby surface water (> 2 miles) and the high dilution factor of the river (>10,000 cfs). Surface drainage from the site eventually discharges to the St. Louis MSD system.

Ref: 1,2,3,11,15

Surface Water Pathway Criteria List  
Primary Targets

Is any target nearby? (y/n/u) If yes: N  
N Drinking water intake  
N Fishery  
N Sensitive environment

Has any intake, fishery, or recreational area been closed? (y/n/u) N

Does analytical or circumstantial evidence suggest surface water  
contamination at or downstream of a target? (y/n/u) N

Does any target warrant sampling? (y/n/u) If yes: N  
N Drinking water intake  
N Fishery  
N Sensitive environment

Other criteria? (y/n) N

PRIMARY INTAKE(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Intakes:

No surface water intakes are located within 15 downstream miles from  
the site.

Ref: 2,11  
continued -----

continued -----

Other criteria? (y/n) N

PRIMARY FISHERY(IES) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Fisheries:

There are no primary fisheries identified for this site. The nearest secondary fishery is the Mississippi River located greater than 2 miles from the site.

Ref: 2,4

Other criteria? (y/n) N

PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Sensitive Environments:

There are no primary sensitive environments for this site. Secondary sensitive environments include wetland areas located along the Mississippi River, which is located greater than 3 downstream miles from the site.

Ref: 2,5

### Pathway Characteristics

Pathway Characteristics			Ref.
Do you suspect a release? (y/n)	No		
Distance to surface water (feet):	13992		
Flood frequency (years):	>500		
What is the downstream distance (miles) to:			
a. the nearest drinking water intake?	N.A.		
b. the nearest fishery?	3.0		
c. the nearest sensitive environment?	3.0		
LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	0		
2. NO SUSPECTED RELEASE		100	
LR =	0	100	

Drinking Water Threat Targets

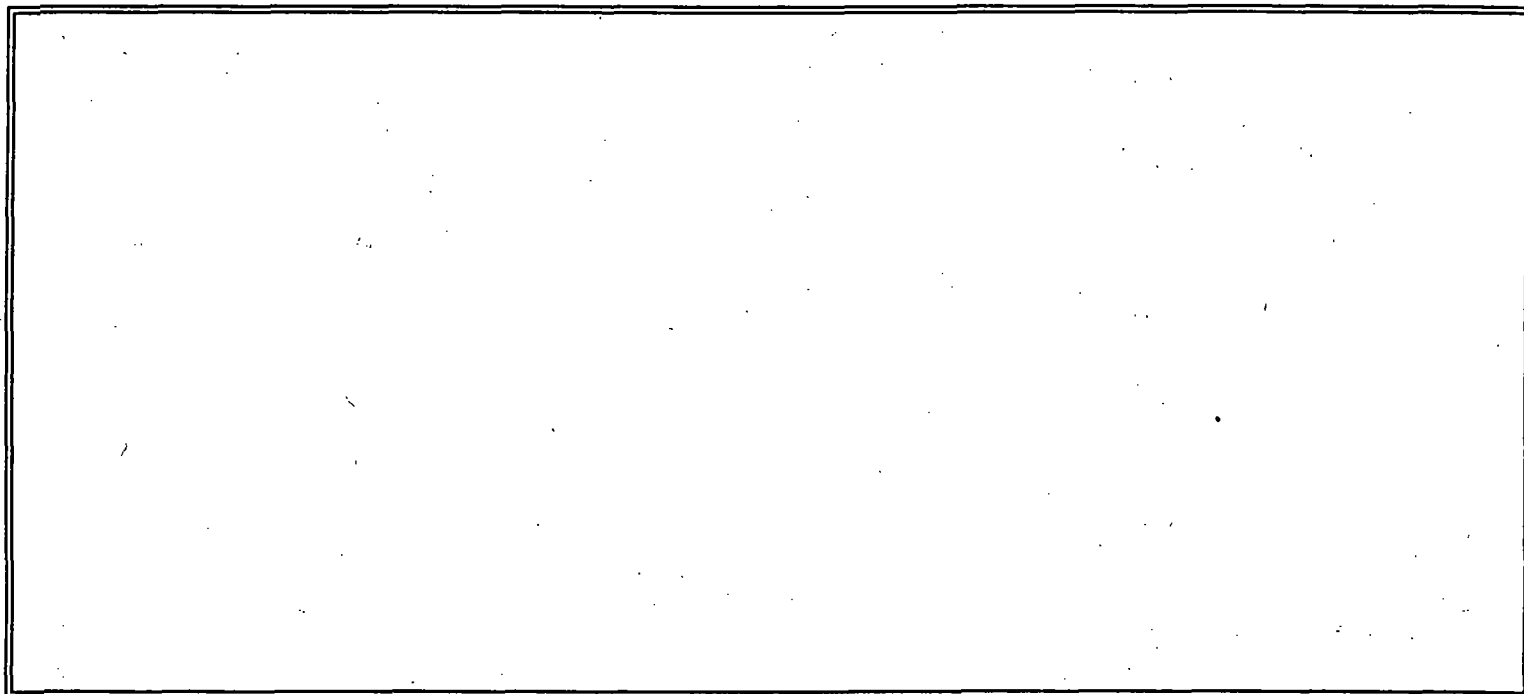
TARGETS	Suspected Release	No Suspected Release	References
3. Determine the water body type, flow (if applicable), and number of people served by each drinking water intake.			
4. PRIMARY TARGET POPULATION 0 person(s)	0		
5. SECONDARY TARGET POPULATION Are any intakes part of a blended system? (y/n): N	0	0	
6. NEAREST INTAKE	0	0	
7. RESOURCES	0	5	
T =	0	5	

Drinking Water Threat Target Populations

Intake Name	Primary (y/n)	Water Body Type/Flow	Population Served	Ref.	Value
1 None	N		0		0
Total Primary Target Population Value					0
Total Secondary Target Population Value					0

\*\*\* Note : Maximum of 6 Intakes Are Printed \*\*\*

Apportionment Documentation for a Blended System



Human Food Chain Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
8. Determine the water body type and flow for each fishery within the target limit.			
9. PRIMARY FISHERIES	0		
10. SECONDARY FISHERIES	0	12	
T =	0	12	

Human Food Chain Threat Targets

Fishery Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Mississippi River	N	>10000 cfs	2,4	12
Total Primary Fisheries Value				0
Total Secondary Fisheries Value				0

\*\*\* Note : Maximum of 6 Fisheries Are Printed \*\*\*

Environmental Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
11. Determine the water body type and flow (if applicable) for each sensitive environment.			
12. PRIMARY SENSITIVE ENVIRONMENTS	0		
13. SECONDARY SENSITIVE ENVIRONS.	0	10	
T =	0	10	

Environmental Threat Targets

Sensitive Environment Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Mississippi River	N	>10000 cfs	2,4,5	0
Total Primary Sensitive Environments Value				0
Total Secondary Sensitive Environments Value				0
*** Note: Maximum of 6 Sensitive Environments Are Printed ***				

Surface Water Pathway Threat Scores

Threat	Likelihood of Release (LR) Score	Targets (T) Score	Pathway Waste Characteristics (WC) Score	Threat Score $LR \times T \times WC / 82,500$
Drinking Water	100	5	18	0
Human Food Chain	100	12	18	0
Environmental	100	10	18	0

SURFACE WATER PATHWAY SCORE:

1

Soil Exposure Pathway Criteria List  
Resident Population

Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination? (y/n/u)	U
Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator? (y/n/u)	N
Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities? (y/n/u)	Y
Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems? (y/n/u)	N
Does any neighboring property warrant sampling? (y/n/u)	Y

Other criteria? (y/n) N

RESIDENT POPULATION IDENTIFIED? (y/n) Y

Summarize the rationale for Resident Population:

Since the full extent of contamination has not been totally identified at the SLAAP site it is difficult to assess if any residential targets are situated within 200 feet of a contaminated source. Some previous investigations have indicated soil contamination and the Tetra Tech survey has also indicated the likelihood of a more widespread contamination problem at the site. At the time of SLAAP's construction, the properties directly to west and northwest were entirely residential. Currently, there is some commercial developments present in these areas. Additional sampling is necessary to identify source areas at the site and to adequately assess the resident population threat. According to the US Topographic map a school is also located about 500 feet southwest of the site. It should be noted that during the site visit conducted by Tetra Tech, no visible signs of surface soil contamination were identified. The majority of the facility is asphalt and concrete covered with about a total of 3 acres of grassy/soil areas. Currently, the site is inactive and there are no workers on site.

SOIL EXPOSURE PATHWAY SCORESHEETS

Pathway Characteristics

		Ref.
Do any people live on or within 200 ft of areas of suspected contamination? (y/n)	Yes	2,12
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination? (y/n)	Yes	2
Is the facility active? (y/n):	No	1

LIKELIHOOD OF EXPOSURE	Suspected Contamination	References
1. SUSPECTED CONTAMINATION LE =	550	

Targets

2. RESIDENT POPULATION 0 resident(s) 0 school/daycare student(s)	0	
3. RESIDENT INDIVIDUAL	0	
4. WORKERS None	0	
5. TERRES. SENSITIVE ENVIRONMENTS	0	
6. RESOURCES	0	
T =	0	

WASTE CHARACTERISTICS

WC = 18

RESIDENT POPULATION THREAT SCORE:

1

NEARBY POPULATION THREAT SCORE:

2

Population Within 1 Mile: 10,001 - 50,000

SOIL EXPOSURE PATHWAY SCORE:

3

Soil Exposure Pathway Terrestrial Sensitive Environments

Terrestrial Sensitive Environment Name	Reference	Value
None		
Total Terrestrial Sensitive Environments Value		
*** Note : Maximum of 7 Sensitive Environments Are Printed ***		

Air Pathway Criteria List  
Suspected Release

Are odors currently reported? (y/n/u)	N
Has release of a hazardous substance to the air been directly observed? (y/n/u)	N
Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air? (y/n/u)	U
Does analytical/circumstantial evidence suggest release to air? (y/n/u)	U
Other criteria? (y/n)	N

SUSPECTED RELEASE? (y/n) N

Summarize the rationale for Suspected Release:

During the site's past operational history, there were most likely air emissions as a result from operations: furnaces used for forge operations were located in Building #2. Information pertaining to the facility's air emissions or any adverse health effects is not available. The site is currently inactive and a suspected release is not suspected. A concern for future tenants/workers at the site does exist however, due to the contaminated buildings and tunnels currently remaining onsite.

Ref: 1,28

AIR PATHWAY SCORESHEETS

Pathway Characteristics

Do you suspect a release? (y/n)			No	Ref.
Distance to the nearest individual (feet):			250	2,28
LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References	
1. SUSPECTED RELEASE	0			
2. NO SUSPECTED RELEASE		500		
LR =		0		

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0		
4. SECONDARY TARGET POPULATION	0	157	
5. NEAREST INDIVIDUAL	0	20	
6. PRIMARY SENSITIVE ENVIRONS.	0		
7. SECONDARY SENSITIVE ENVIRONS.	0	0	
8. RESOURCES	0	5	
T =		0	182

WASTE CHARACTERISTICS

WC =

0	18
---	----

AIR PATHWAY SCORE:

20
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Air Pathway Secondary Target Populations

Distance Categories	Population	References	Value
Onsite	0		0
Greater than 0 to 1/4 mile	1607		41
Greater than 1/4 to 1/2 mile	4337		28
Greater than 1/2 to 1 mile	17928		26
Greater than 1 to 2 miles	56371		27
Greater than 2 to 3 miles	76785		12
Greater than 3 to 4 miles	107207		23
Total Secondary Population Value			157

Air Pathway Primary Sensitive Environments

Sensitive Environment Name	Reference	Value
None		
Total Primary Sensitive Environments Value		

\*\*\* Note : Maximum of 7 Sensitive Environments Are Printed\*\*\*  
Air Pathway Secondary Sensitive Environments

Sensitive Environment Name	Distance	Reference	Value
None			
Total Secondary Sensitive Environments Value			

SITE SCORE CALCULATION	SCORE
GROUND WATER PATHWAY SCORE:	1
SURFACE WATER PATHWAY SCORE:	1
SOIL EXPOSURE PATHWAY SCORE:	3
AIR PATHWAY SCORE:	20
SITE SCORE:	10

SUMMARY

1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water? No

If yes, identify the well(s).

If yes, how many people are served by the threatened well(s)? 0

2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?
- |  |    |
|--|----|
| A. Drinking water intake                                     | No |
| B. Fishery   | No |
| C. Sensitive environment (wetland, critical habitat, others) | No |

If yes, identify the target(s).

3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility? No

If yes, identify the properties and estimate the associated population(s)

4. Are there public health concerns at this site that are not addressed by PA scoring considerations? Yes

If yes, explain:

Public health concerns do appear to exist at the SLAAP site due to contaminated buildings and tunnels remaining onsite.

REFERENCE LIST

1. Tetra Tech EM Inc.. 1999 Draft Phase I Environmental Baseline Survey Report, St. Louis Army Ammunition Plant, St. Louis, MO. Prepared for U.S. Army Aviation and Missile Command, Redstone Arsenal, Alabama
2. United States Geological Survey (USGS), 1984(b). 7.5 -Minute Series Topographic Map of the Clayton, Missouri Quadrangle.
3. Environmental Science and Engineering, 1987. Update of the Initial Installation Assessment of St. Louis Army Ammunition Plant. July
4. Robinson, John. December 14, 1998. Fisheries Research Biologist for Mo Dept. of Conservation. Subject: Commercial fishery harvest in vicinity of site.
5. U.S. Department of the Interior. 1993. Fish and Wildlife Service. National Wetland Inventory Map. Washington, D.C.
6. Missouri Department of Natural Resources, Division of Geology and Land Survey, Registered wells/logs within a 4-mile radius of the SLAAP site
7. Kraeger, Bob, April 8, 1999. Environmental Specialist for MoDNR Subject: PCB/TSCA Notice of Noncompliance with SLAAP, Jan. 1991.
8. Phillippi, Dave, April 7, 1999. Toxics Substances Control Section/ Toxics and Pesticides Branch, USEPA. Subject: PCB/TSCA Notice of Non compliance with SLAAP, Jan. 1991.
9. Geller, Bob, April, 1999. MoDNR Federal Facilities Section Chief. Subject: St. Louis Army Ammunition Plant/ St. Louis Ordnance Plant.
10. Geographic Exposure Modeling, (GEMS), 1997
11. Bell, Charlie, September, 1998, Illinois EPA Public Water Supply. Personnel communication with Martha Kopper (Ecology & Environment, Inc)
12. U.S. Department of Commerce. 1990. 1990 Census of Population and Housing, County of St. Louis.
13. Kerns, Don, 1999. MoDNR DOD Unit Chief Subject: St. Louis Army Ammunition Plant/St. Louis Ordnance Works.
14. U.S. Army Toxic and Hazardous Materials Agency (USATHMA). 1979. Installation Assessment of St. Louis Army Ammunition Plant. Report No. 153. December.
15. USCOE, 1989. Investigation and Evaluation of Underground Storage Tanks St. Louis AAP, St. Louis, Missouri, September.
16. Missouri Department of Natural Resources, 1995. Letter to US ATCOM regarding SLAAP site inspection.

17. Woodward-Clyde-consultants. 1996. Health Based Risk Assessment, Building No. 3, Army Ammunition Plant, St. Louis, Missouri, June.
18. Missouri Department of Natural Resources, 1994. Letter to US ATCOM regarding eligibility for inclusion in the National Register of Historic Places.
19. Missouri Department of Conservation, 1993. Letter to US ATCOM regarding impacted natural resources at SLAAP.
20. United States Environmental Protection Agency, 1993. Letter to US ATCOM regarding remediation of PCB contamination in Building #3.
21. United States Environmental Protection Agency, 1991. Notice of Noncompliance TSCA Docket Number VII-91-T-304 to US AVSCOM for PCB contamination in Building #3.
22. US AVCOM, 1990. Letter to Bob Jackson, USEPA regarding PCB contamination and remediation and removal of creosote wood.
23. Missouri Department of Natural Resources, Environmental Laboratory Services, 1991. Analytical results of swipe samples from Building #3. January.
24. St. Louis Ordnance Plant, United States Cartridge Company, McQuay-Norris Manufacturing Co. Circa 1941. Bullets by the Billions.
25. Dames and Moore, 1994. Remediation Design and Development Report for Plant Facilities Engineering, Inc. Job No. 06702-113-209.
26. U.S. Army Environmental Hygiene Agency, 1993. Preliminary Assessment Screening No. 38-26-K19X-93, St. Louis Army Ammunition Plant.
27. Conwell, Dennis, 1966. Memo to Richard Barttelbort regarding sewer discharge from SLAAP to MSD system. October.
28. Atchison, Tammy, 1999. Former industrial hygienist at ATCOM. Personal communication. Subject: Condition of underlying tunnels at SLAAP/SLOP.

## **ATTACHMENT 3**

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### **HRS Scoring Deficiency Checklist**

# HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

Date Reviewed: June 1999

EPA ID#: MO42100221222

Reviewed By: Ecology & Environment, Inc.

Facility Name: 4800 Goodfellow Blvd

City/State: St. Louis, Missouri

INFORMATION IS...(Check Box if YES)

## 1. OVERVIEW/SITE HISTORY

Provided    Acceptable    Not Provided    Estimated by START

- |  |                                     |                                     |                                     |                                     |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1A. Report submitted to EPA are referenced and copies of each reference are provided.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 1B. Describe facility operations (manufacturing, storage, waste disposal practices, etc.) Including the following:   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 1B1. History of the facility and sources (any area containing or potentially containing hazardous substances).   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1B2. A topographic map with a 4-mile radius drawn around each site.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 1B3. A facility and source location map and sketch.  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1B4. Regulatory history of the facility (e.g., RCRA facility, TSCA, CERCLA, NPDES permits, etc.).  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1C. Describe any emergency response actions or interim remedial actions that have occurred at the facility. Description should include amount of material removed, disposal location, and sample analytical results prior and subsequent to removal. | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1D. Describe any release of hazardous substances, pollutants, or contaminants to groundwater, surface water, soil or air and provide sampling with detection limits, laboratory methods, and quality assurance procedures.                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1E. Give the following population within each radius indicated below. Each radius should begin at the center of each source if the source is small or at the outer edge if the source is large. Count population in overlapping areas only once.     |                                     |                                     |                                     |                                     |
| 1E1. 0—¼ mile.   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1E2. ¼—½ mile.   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1E3. ½—1 mile.   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1E4. 1—2 miles.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1E5. 2—3 miles.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1E6. 3—4 miles.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 1F. Describe any prior spills (e.g., quantity of the spill, hazardous substances) that occurred at the facility.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 1G. Describe facility and source security and access (e.g., fences, patrol gates, natural barriers, etc.).   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

## 2. WASTE/SOURCE INFORMATION (see Section 2 of the HRS Final Rule, *Federal Register*, December 1990).

- |  |                                     |                          |                          |                                     |
|--|-------------------------------------|--------------------------|--------------------------|-------------------------------------|
| 2A. Describe as specifically as possible the types of wastes produced at the facility and the methods in which these wastes were treated, stored, or disposed of (including location of disposal).           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2B. Describe as specifically as possible the amount (volume, weight, etc.) of each waste type produced and the form in which it was discharged or disposed (e.g., solid, liquid, gas, etc.) at the facility. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2C. Describe each source type (e.g., landfill, surface impoundment, etc.) located within the facility boundary.  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

INFORMATION IS...(Check Box if YES)

	Provided	Acceptable	Not Provided	Estimated by START
2D. Describe as specifically as possible the constituents (concentrations of individual constituents) of each waste type disposed in each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2E. Describe as specifically as possible the amount of waste treated, stored, or disposed of in each source (e.g., landfills, impoundments, tanks).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2F. Determine the depth at which wastes were deposited in each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2G. Describe as specifically as possible the condition/integrity of each source (e.g., do landfills have liners or caps?).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2H. Describe any secondary containment features/structures associated with each source (e.g., precipitation run-on and runoff systems, leachate collection systems, gas collection systems, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2I. Determine the size, volume, capacity, and area of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>3.0 GROUNDWATER PATHWAY INFORMATION</b> (see Section 3 of the HRS Final Rule, <i>Federal Register</i> , December 1990.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3A. Determine if the groundwater within a 4-mile radius of each source is used for any of the following purposes and locate the wells on a map. Each radius should begin at the center of each source if the source is small or at the outer edge if it large. Provide the depth of each well.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3A1. Private or Public Drinking Water Source	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3A2. Irrigation of commercial food or commercial forage crops (include acres).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3A3. Commercial livestock watering.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3A4. Commercial aquaculture.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3A5. Water for major or designated recreational area, excluding drinking-water use.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3A6. Standby wells used for drinking water at least once a year.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3B. Outline the public water distribution system within a 4-mile radius of each source on a topographic map.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3C. Identify the nearest drinking water well within a 4-mile radius of each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3D. Determine the population (including workers, students, and residents) drawing from each drinking-water well within the following radii. Each radius should start at the center of each source if the source is small, or at the outer edge if it is large. Count overlapping population only once.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3D1. 0—¼ mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D2. ¼—½ mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D3. ½—1 mile.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D4. 1—2 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D5. 2—3 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3D6. 3—4 miles.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3E. Describe known or probable groundwater flow direction from each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3F. Describe as specifically as possible the geology and hydrogeology of the facility area (including geological formation names, thickness, types of material, hydraulic conductivities, and depth to aquifers); provide references.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

INFORMATION IS...(Check Box if YES)

	Provided	Acceptable	Not Provided	Estimated by START
3G. Discuss any evidence of aquitards and discontinuities between aquifers within a 4-mile radius of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3H. Describe any evidence of interconnections between the uppermost aquifer and the lower aquifer within 2 miles of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3I. Estimate annual net precipitation at the facility.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3J. Discuss soil or geologic conditions that might inhibit or facilitate groundwater migration.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3K. Determine if sources are located in an area of Karst terrain.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3L. Provide results from groundwater sampling of aquifers underlying the sources and from domestic wells (drinking water) within 2 miles of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3M. Provide results from background groundwater sampling of aquifers underlying the sources.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3N. Determine if any areas within a 4-mile radius of each source are located in a Wellhead Protection Area according to Section 1428 of the Safe Drinking Water Act.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>4.0 SURFACE WATER PATHWAY INFORMATION</b> (see Section 4 of the HRS Final Rule, <i>Federal Register</i> , December 1990.)				
4A. Describe surface water bodies 0 to 15 miles downstream of each source and provide a map of surface water bodies receiving drainage from each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4B. Discuss the probable surface runoff pattern from each source to surface waters, including the distance to the nearest surface water body; provide a map.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4C. Describe the point(s) at each source where hazardous substances begin to migrate and their probable point(s) of entry into a surface water body (including ponds, lakes, streams, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D. Identify if surface water drawn from intakes within 15 miles downstream of the probable point of entry is used for any of the following purposes:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D1. Irrigation (5-acre minimum) of commercial food or commercial forage crops.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D2. Watering of commercial livestock.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D3. Ingredient in commercial food preparation.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D4. Major of designated water recreation area, excluding drinking water.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E. Identify the following targets associated with surface water bodies 0 to 15 miles downstream of the probable point of entry:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E1. Population (residents, workers, and students) served by surface water intakes of drinking water.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E2. Sensitive environments (see Table 4-23, of the HRS Final Rule, <i>Federal Register</i> , December 1990) and critical habits for federally endangered or threatened species.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E3. Economically important resources (e.g., shellfish).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4E4. Any portion of the surface water designated by a state for drinking water use under Section 305(a) of the Clean Water Act; or any portion of surface water usable for drinking water.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4F. Determine the miles of wetland (wetland frontage) along surface water bodies 0 to 15 miles down stream from the probable point of entry (see 40 CFR section 230.3).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4G. Provide results from sampling of wetlands and/or sensitive environments 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

	INFORMATION IS...(Check Box if YES)			
	Provided	Acceptable	Not Provided	Estimated by START
4H. Discuss any qualitative, quantitative, or circumstantial evidence of contamination of surface waters from source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4I. Provide results from sediment and surface water sampling for points 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4J. Provide results from background sediment and surface water sampling.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4K. Provide results from sampling of surface water intakes 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4L. Estimate the size of the upgradient drainage area for each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4M. Determine the 2-year, 24-hour rainfall for the site.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4N. Discuss the average annual streamflow associated with each surface water body located 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4O. Determine surface soil types at the facility.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4P. Determine if sources are located in a 1-year, 10-year, 100-year, or 500-year flood plain.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4Q. Discuss fisheries (recreational or commercial) in surface water bodies 0 to 15 miles downstream of each source:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4Q1. Describe annual production (in pounds) of human food chain organisms (e.g., trout, shellfish, snapping turtles, crabs) per acre of streams and rivers 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4Q2. Describe annual production (in pounds) of human food chain organisms (e.g., trout, shellfish, snapping turtles, crabs) per acre of ponds, lakes, bays, or oceans 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4R. Identify closed fisheries 0 to 15 miles downstream of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4S. Provide results from sampling of human food chain organism tissues in streams and rivers 0 to 15 miles downstream of each source and in ponds, lakes, and bays that receive drainage from the sources.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>5.0 AIR PATHWAY INFORMATION (see Section 4 of the HRS Final Rule, Federal Register, December 1990.)</b>				
5A. Describe if there has been an observed release (i.e., visual or analytical evidence) of a hazardous substance to the atmosphere.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5B. Determine the shortest distance to the closest residence or regularly occupied building or area from any on-site source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5C. Determine if any of the following resources are located within a 1/4-mile radius of each source:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5C1. Commercial agriculture.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5C2. Commercial silviculture.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5C3. Major or designated recreation area.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5D. Determine if sensitive environments are within 4-mile radius of each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5E. Determine the total area of wetlands within a 4-mile radius of each source.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## HRS Scoring Deficiency Check List

Facility Name: St. Louis Army Ammunition Plant

INFORMATION IS...(Check Box if YES)

**6.0 SOIL EXPOSURE PATHWAY INFORMATION** (see Section 5 of the HRS Final Rule, *Federal Register*, December 1990.)

Provided    Acceptable    Not Provided    Estimated by START

6A. Describe any areas of contamination that are within 2 feet of the ground surface; provide the areal extent of contamination.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6B. Provide locations and depths of soil samples and results.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6C. Provide results of background soil sampling.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6D. Identify locations of the closest residence, school, or daycare within 200 feet of each source; provide population of each.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**\*Additional Comments:**

- 1A.- An EBS report was provided and highlighted areas of concerns (mainly areas within buildings) with attachments concerning the site survey/history, etc. Actual references used were not available. The report was however, very informative.
- 1B1.-The EBS report was infomative concerning the SLAAP facility history and each bulding operation processes; however, data gaps remain concerning operations and type of wastes after the munition plant. Unclear of waste handling practices/sources in the 1970s, 80s, etc. Also limited information in file and report regarding wastes other than PCBs in Building #3. The EBS report mainly highlighted areas of concern within each building on the property.
- 1B4.- Limited information on regulatory history. Information submitted included Notice of Noncompliance from EPA regarding TSCA regulations for Building #3. Discussions with MoDNR yielded pertinent information obtained by START research.
- 1C.- SLAAP provided limited interim remedial actions information regarding the yet unresolved cleanup of PCBs from Building #3. START obtained additional information from MoDNR and EPA regarding remedial actions issues. Limited information was available concernign amounts of materials removed and analytical results. There was no file information concerning analtical samples collected after subsequent removals.
- 1D.-Some sampling, detection limits, laboratory methods, quality assurrance procedures were provided for the 1991 sampling of PCBs in Building #3. No ground water, surface water, or air sampling was conducted at the site. Limited soil sampling conducted outside of the buildings.
- 1E.-SLAAP did not provide population information. START estimated the population using GEMS software program.
- 1F.-Limited documents discussed PCB contamination in Building #3 and possible oil leaks in Building #2. No reports of any spills. The EBS report highlighted areas of concern identified during a site tour of the facility.
- 2A.- SLAAP provided general information on the types of waste, little to no information on treatment, storage, and disposal of waste. Specific information prior to RCRA enactment was not included. Information concerning waste handling operations after the munition plant closed was also not provided.
- 2B- SLAAP did not provide information on the amount of wastes and the forms in which it was disposed. START obtained some of this information from MoDNR. It is unknown if all waste types and disposal areas have been identified.
- 2C.-SLAAP indicated possible area of concerns (mainly within buildings) in their EBS report. START has inferred source types and locations based on the operational history of the site.
- 2D.-SLAAP included generic discussions of constituents (ie:gasoline, heating oil) rather than specific chemicals (with the exception of sampling Building #3 which indicated PCB contamination and VOC contamination at Building #10).
- 2E.-SLAAP did not describe the amount of waste treated, stored, or disposed of. Information prior to RCRA enactment was not included.
- 2F.-SLAAP did not indicate the approximate depth of excavations for the removal of the Underground Storage Tanks. No other reports on depths were included in the files.
- 2I.-SLAAP through supplied documents, provided the volume of the UST contaminated soil removal. The size, capacity and areas of all other potential sources

were not identified. START estimated some source areas for PA scoring purposes.

- 3A1.- SLAAP indicated that the closest private drinking water wells were about 3 miles from the site, but did not note owner or depth. START research determined that two private drinking water wells are located within the three mile radius.
- 3C.- SLAAP indicated closest private water wells were beyond 3 mile radius. START research determined two private water wells are located within the three mile radius.
- 3D.-No population was determined by SLAAP for the water wells. START estimated population drawing from each water well based on 1990 Census data.
- 3E.-SLAAP provided a general description of the groundwater flow direction from the site.
- 3F.-The EBS did indicate some geological information; however hydraulic conductivities and depths to aquifers was not provided. Reference concerning geology and hydrogeology was not provided.
- 4A.-SLAAP did not provide a map of the site which included surface water bodies downstream from the source(s) and did not show the relationship of the site to surface water bodies receiving drainage. START inferred this information for PA Score purposes.
- 4B.-SLAAP did not include a map or describe the probable surface water runoff pattern from each potential source to surface waters.
- 4E.-The only target information provided was the identification of two wetland areas near the site. These wetland areas are not contiguous to a surface water body. Surface water sampling was not conducted and there was no information concerning surface water intakes sensitive environments, or fishery areas along the Mississippi River. It should be noted that the closest surface water body (Mississippi River) is located greater than 2 miles away.
- 5A - No information was provided regarding air releases to the atmosphere.
- 5D -Some wetland information was provided, but are located greater than 1 mile from the site.
- 6A.- SLAAP approximately described, through UST remediation documents, contamination within 2 feet of the ground surface. Areal extent was not included in any discussion. START inferred this information in the PA Score.
- 6B.-The EBS report noted potentially contaminated areas (mainly within buildings). Depths of UST confirmatory soil samples and results were not available.
- 6C.- No background soil samples were taken.
- 6D.- File information and the EBS report did not indicate closest residence or school within the vicinity of the site. START estimated approximate distances.

\* NOTE: Where information is provided but not acceptable, discuss briefly, why the information is not acceptable.

# DOCUMENT LOG SHEET

TDD# S07-9902-008A

PAN# 1165SLTGFF

PROJECT NAME: St. Louis Army Ammunition Plant (Army-SLAAP)

CITY/COUNTY/STATE: St. Louis, Missouri

PROJECT LEADER: KOPPER

EPA CONTACT: DIANA BAILEY

COMPLETION DATE:

SOURCE OF FUNDS: (Shaded Area Below)

10-01-99

CERCLA

OPA/CWA

CEPP

X

TDD: 08-11-99 LKS

AOC:

## DELIVERABLES

FORMAL REPORT:

LETTER REPORT:

FORMAL BRIEFING:

OTHER (SPECIFY):

VENDER PACKET:

ADMIN. REC.:

DISKS:

PRINTOUTS:

MEMO:

VERBAL BRIEFING-NO DELIVERABLE NEEDED:

OTHER (SPECIFY):

SITE SAFETY PLAN:

LOG BOOK(S) (HOW MANY):

PHOTOGRAPHS:

PHOTOGRAPHIC RECORD:

CONFLICT OF INTEREST (COI) FORM:

TYPING REQUEST FORM(S):

OTHER (SPECIFY):

Funding Source: Federal Facility

PROJECT LEADER INITIALS/DATE:

Place An "X" Next To Document Being Filed. Include Date of Document, Name of Document (or brief description), Date Filed, and Your Initials.

S07-9902-008A  
St. Louis Army Ammunition Plant

105  
7/23/99

**EPA**

**Technical Direction Document  
Amendment**

REC  
07-99-02-0008-A

1165SLTGFF

START CONTRACT #: 68-W6-0012

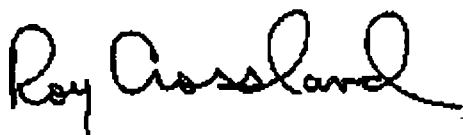
Kopper

<b>Activity Type:</b> IV.A.1. Preliminary Assessments <b>Task:</b> Federal Facility PA Review <b>General Task Description:</b> Conduct Federal Facility PA Review on currently owned Fed. Fac. under DOD/Army <b>Completion Date:</b> 10/01/99		<b>Created On:</b> 05/21/99 <b>DPO/PO:</b> Diana Bailey <b>Task Monitor:</b> Diana Bailey <b>Task Codes:</b> TG/FF; RX
<b>Site/Project Name:</b> St. Louis Army Ammunition Plant (Army-SLAAP) <b>Street Address:</b> 4800 Goodfellow Blvd <b>County Name:</b> Saint Louis <b>City, State, Zip:</b> St Louis, MO 63120 <b>SSID #:</b> 07YX <b>CERCLIS #:</b> MO4210021222	<b>Estimated Cost:</b> \$0.00 <b>Estimated Hrs:</b> 0	
<b>Funds Source:</b> Federal Facility <b>DCN #(s):</b> W18149 () CERCLA/FUDs \$0.00	<b>Deliverable:</b> CERCLA PA w/RSE, CERCLIS Data Entry Information, Letter Report <b>Overtime:</b> Not Applicable <b>Reference:</b> No	
<b>TDD Expenditure Limit:</b> \$9,000.00 <b>Hours:</b> 180	<b>Staffing:</b> Dedicated Staff <b>Priority:</b> High <b>Start Date:</b> 02/10/99	

**Specific Element(s):** Coordinate activities with RPM/OSC, Complete PA-Score Sheets, Obtain and review existing site, facility and/or release data provided by EPA, Make recommendations and provide options to EPA as to further response action, Review EPA files for background information, Meet w/ EPA prior to issuance of site-specific TDD

**Comments:** This is file review task and does not involve field work or sampling or a site visit. This is a Desk audit of the file material provided. This is a EPA review of the Fed. agencies material as if EPA was doing the PA and a audit of what is and what is not missing. Mark missing data on a check list. Task code is RX; DCN/Account code **W18149 98T07W0FFAX25053207WZZB00**; Line Ref is **BFM** This is a **High** priority because the Army and GSA has put this site on a fast track for property transfer. Coordinate with Diana Bailey ex. 7717. TDD amended to extend completion date per Diana's request.

**A. TDD Created By: - Signed by Roy Crossland/SUPR/R7/USEPA/US on 05/21/99 06:19:14 AM, according to**

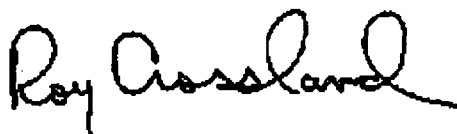


Roy Crossland

05/21/99

Signed On:

**B. Reviewed and Approved By: - Signed by Roy Crossland/SUPR/R7/USEPA/US on 05/21/99 06:19:14 AM, acc**



Project Officer:

Roy Crossland

05/21/99

Signed On: